THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CVII. No. 2413.] LONDON, AUGUST 10, 1909. [61ST YEAR. PRICE 6d.

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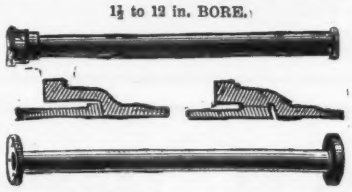

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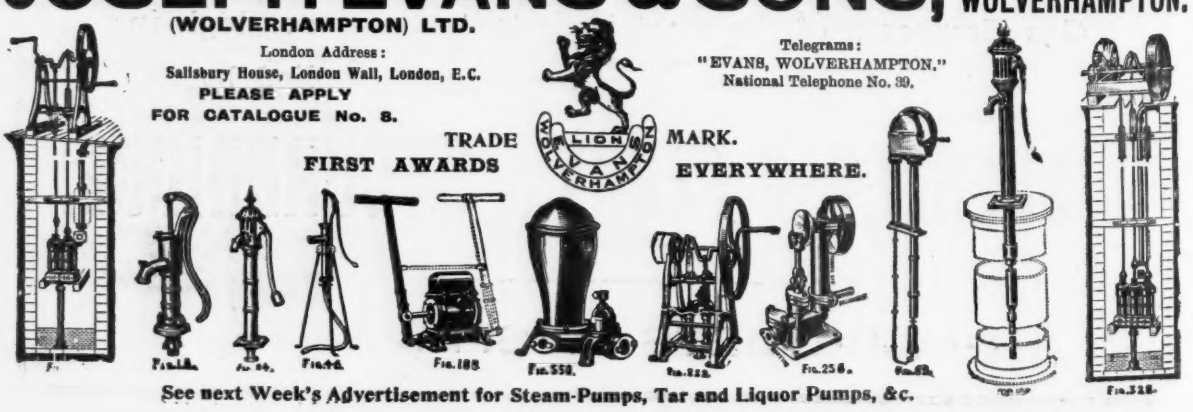

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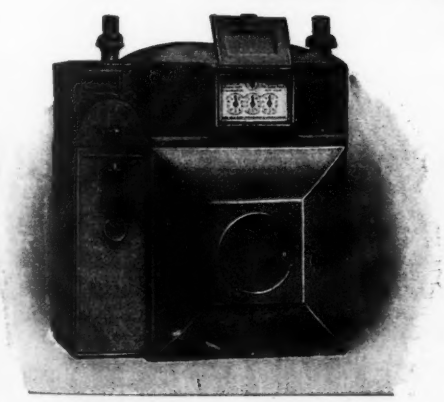

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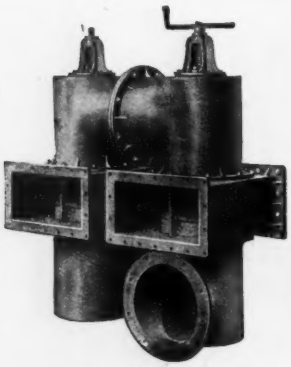

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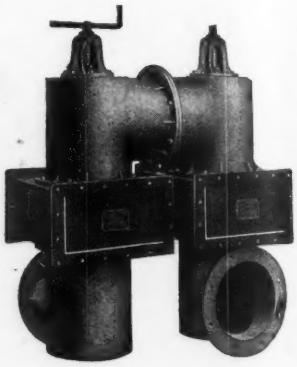

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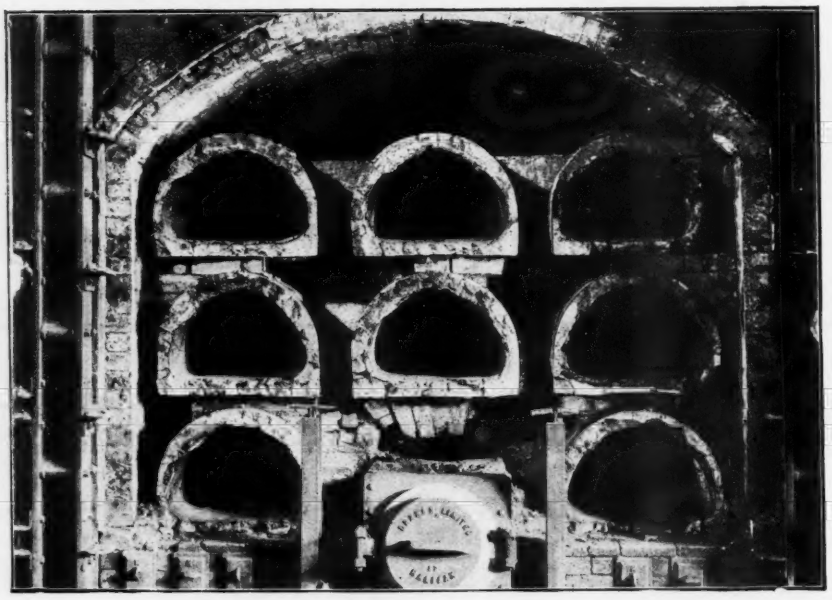

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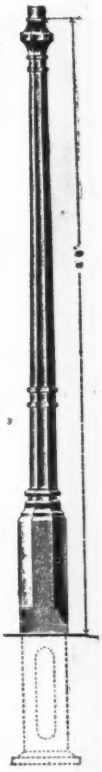

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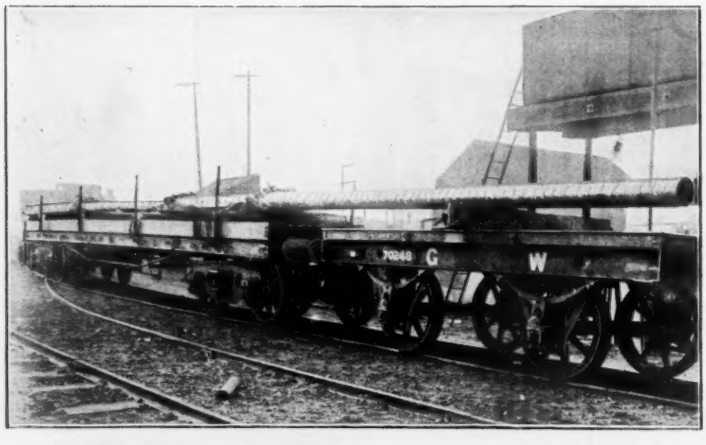

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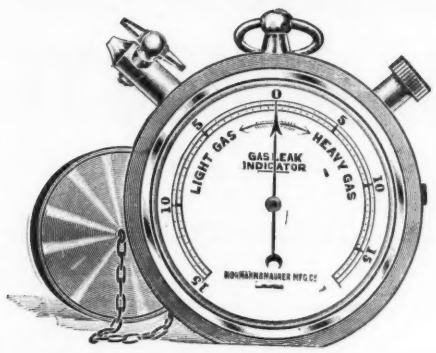

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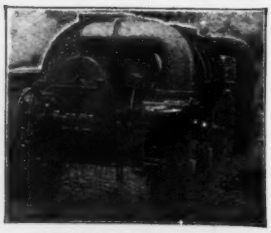

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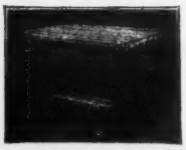

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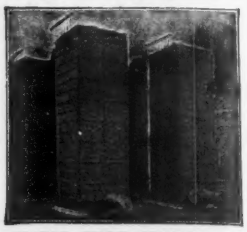

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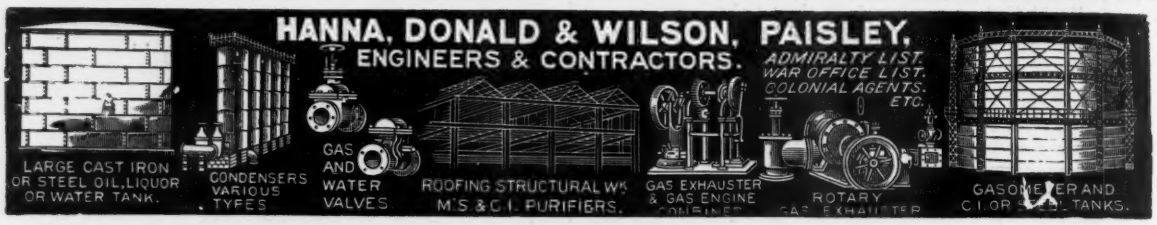

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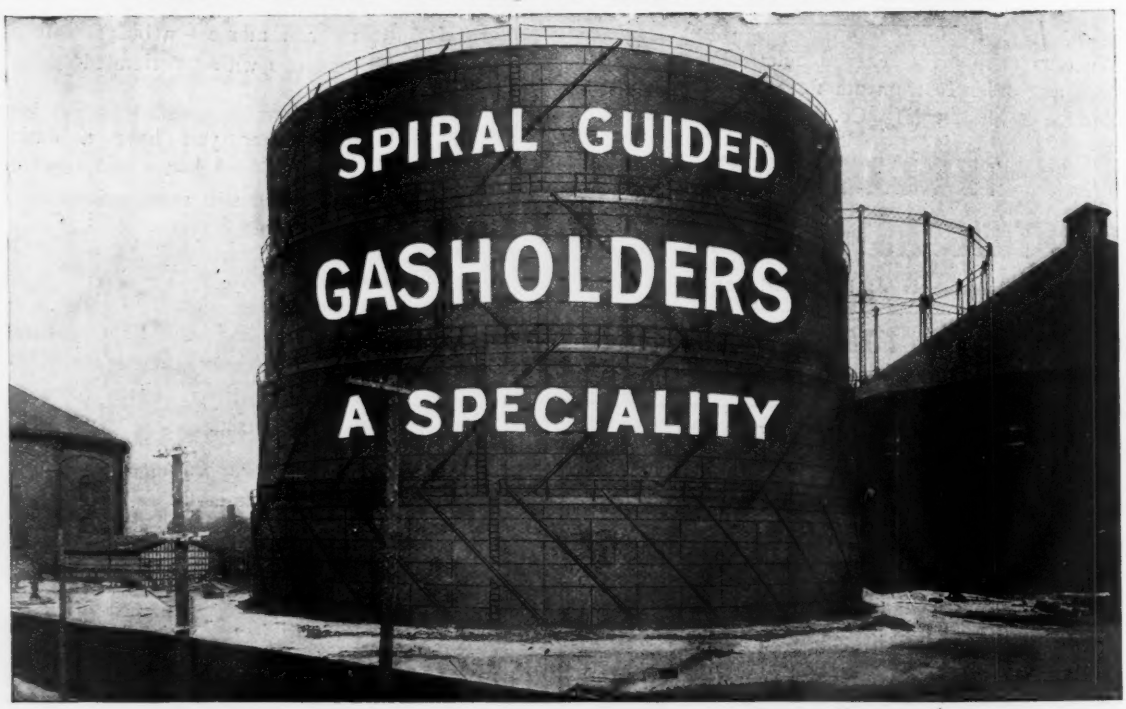

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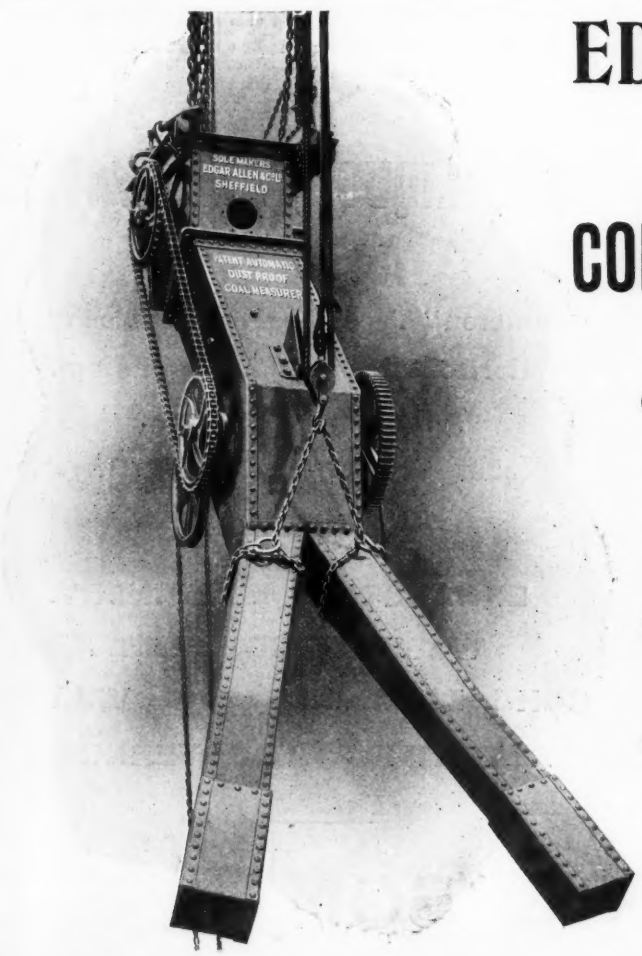

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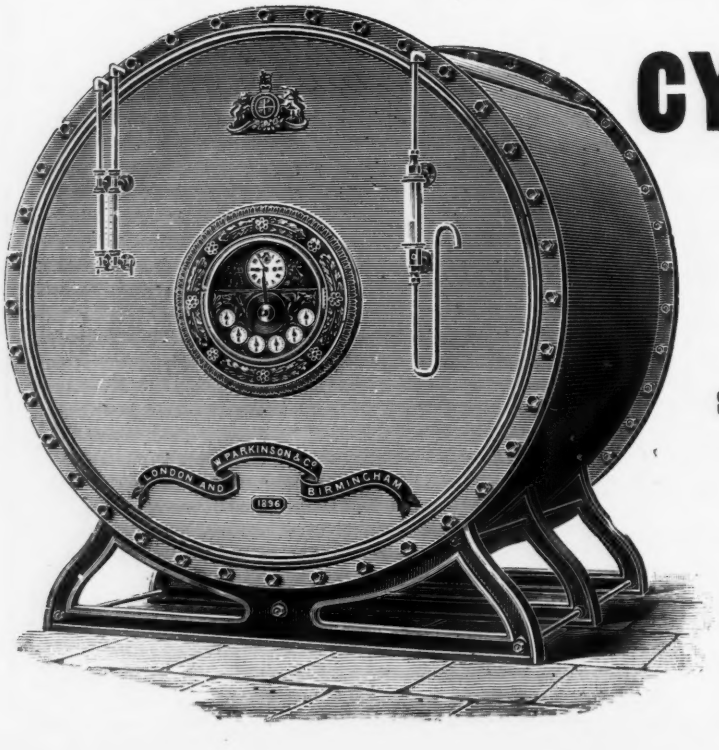

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EDITORIAL NOTES—GAS, &c.

No Turning Back.

IT is in the future that the greatest interest rests in connection with the Gaslight and Coke Company; and this the most superficial reader of the report of the proceedings at the meeting of the proprietors last week will see. But in looking to the future, the immediate past must not be forgotten; for it is through the recent strenuous work and the bold strokes of gas statescraft that the regeneration of this huge concern has been witnessed, and the still further reformation that lies before has been rendered possible. What is to be, what will be, could never have been brought about without the drastic schemes for regeneration that have been unfolded (and of which, we go so far as to say, there will be more yet) during the past three-and-a-half years—the period of the Governorship of Mr. Corbet Woodall. Everything has been changed; that which was labelled impossible has been shown to be possible; the victims of fallacies have been convicted of the errors of their thoughts and contentions; and the proof is in the benefits that have been scattered around. The consumers are enjoying gas at a lower price than ever before; and there is more concession forthcoming. The proprietors are in receipt of a dividend on a scale that they long since abandoned all hope of receiving; their ordinary stock stands five points or so above par, instead of several points below; the workers are participating in the prosperity of the undertaking; and the financial stability of the Company is greater than at any time within memory. And what is of no less importance, the Company, through these changes, stand in higher estimation than in the past with the authorities and the public, and in the Money Market. The greatest asset of a concern of such magnitude is its credit; and the credit of the Gaslight and Coke Company is in high place to-day. These things are now mentioned, and the acknowledgment made, because the time has come to largely concentrate attention on the future.

The great concern is in a period of transition. It would never have reached this period under the indolent conservative administration of the past, when appreciation of needs was beyond the comprehension of those in supreme control, which supreme control they exercised with cast-iron rule. If ever a gas undertaking showed the necessity of specialist direction, the Gaslight and Coke Company is that one. However, the transition that directs thoughts to the future comprises the placing of Metropolitan gas conditions on a uniform basis. From the beginning of next year, there will be a uniform 14-candle illuminating power standard in the Metropolis; and the whole of the gas workers of London, including the men coming within the extension of the Gaslight and Coke Company's operations, will be working under the system of co-partnership, into the enjoyment of which the larger Company's staff have already entered. The gas consumers in the Company's area and the public authorities will receive a concession in the prices charged for gas, representing the round sum of £100,000 a year. A simultaneous introduction of considerable moment is the calorific standard for the gas supplied by the Company; but heading these changes is the annexation of the important area of the West Ham Gas Company, which will give the Gaslight Company just the outlet they require for prosecuting a vigorous campaign for an increase of business, by which existing spare works and plant may soon be brought into profitable occupation. The state of transition, having regard to the extensive character of the operations of the Company, is such a one as no other Gas Company have been involved in. But there is no peril in it all; on the contrary, it means a reinforcement of security. The lower illuminating power gas, the lower price, the development of business on the eastern side of the district, and the still latent economies in manufacture, distribution, and management (spread over the whole business) are all safeguards of genuine worth and prospective tangible effect. But upon the potentialities of the situation in these various directions, it is impossible at present—though realizing their importance—to place any limit, or estimate of value. But it is possible to see in all these changes, which hinge so much one upon the other, an accumulation of benefit to consumers, proprietors, and co-partners.

If humanly preventible, there is to be no turning back. This is one of the canons of the Company's administration to-day. Said the Governor at the meeting, with the emphasis that betokens resoluteness: "If our policy is to be successful, it should be consistent. Reductions once made must "be maintained. There must be no turning back to higher "prices, except under circumstances which are plainly irresistible. At the same time, having regard to the moderation of our standard price and to the new condition under "which each lowering of price brings not only gain to the "consumers but additional income to the employees, it is "reasonable that the shareholders should receive the full "dividend to which they are entitled." In this announcement are compressed the guiding laws of the future, the continued forward policy, and the principle of equality, within statutorily defined limits, for all who contribute whether by capital, custom, or work to the well-being of the undertaking. With any and every condition that may confront the Board and their executive officers, there is to be no compromise, if it can possibly be averted, that will mean a retracing of steps. In this happy resolve, the proprietors are fully with the Directors; and the confidence they have in them in the present passing to new conditions has never been, under other less momentous circumstances, more heartily and sincerely expressed than at the meeting on Friday.

It is true that in the Bill of this session delineating and sanctioning the new conditions—a Bill that has passed through its parliamentary stages, and now only awaits the Royal Assent—the Board have undertaken bold obligations. They were necessary. That they are onerous has been fully recognized; but they have all been rationally and exactingly calculated. And the Directors would have gone somewhat further, had this been necessary to have carried through their plans. Among their obligations is a reduction in price to both private and public consumers which will, as already stated, represent a concession of about £100,000 a year; while accompanying this withdrawal of revenue, there may be some further loss on residuals. But, in the new coal and oil contracts alone, there is within sight a saving considerably in excess of any likely recession in income from gas reduction and lower market values for residuals. The decreased cost of the raw material is therefore an economy in hand; and prospective economies are looked for in the reduction of the illuminating power, in the development of the volume of business through the increased sale of gas in the extended area and through the reduction of price, and generally in manufacture, from all of which may safely—of course, recognizing that there are limitations to the field of observation—be anticipated a larger margin of profit. There is full contentment with the prospects. Even the calorific power test—which was a condition surrendered in the removal of the hostility to the Bill in Parliament of powerful authorities, who by their subsequent quiescence virtually became allies—is not a disturbing element in the position. The Governor's own words on this matter are noteworthy: "So large a pro-"portion of the gas we supply is now used for purposes where "heat only is required, that the call for a calorific test is reasonable. The standard of the test is such that we have little "fear that under it we shall be called upon for penalties." But this must be read in conjunction with the Governor's former protest against a dual penalty test.

The position and conditions of the Company as from Jan. 1 next are such that they cannot fail to captivate interest. For the results as they develop, there will be a curious watching throughout the gas industry. The best thing we can hope for the Company is that nothing will intervene to restrain freedom in working to the highest ends under their new circumstances.

Carbonizing Methods, and the Standard of Quality.

THERE was quite a respectable amount of technical interest in the speech with which, before the proprietors, Mr. Charles Hunt inaugurated on Friday his tenancy of the chair of the South Suburban Gas Company; and in a co-partnership company's meeting, where many present are quite capable of appreciating a general statement of the technical position, such an exercise is not by any means out of place. Mr. Hunt focussed the position of the newer carbonizing practices in retorts set on the old principles, as distinct from the vertical system, and which "newer practices," the half-yearly reports as they come in from all quarters of the country show, are making an immense impression on the manufacturing costs through the augmentation of the make of gas per ton of coal, the lessened quantity of coal required for a given make, and the reduction of carbonizing wages. The newer methods have made a big impression on the South Suburban manufacturing results—financial and working; and the Chairman had excellent illustration in the accounts with which he had to deal. Carbonization has for some time been a strong point at Lower Sydenham, and a strong point with the Engineer (Mr. S. Y. Shoubridge), who had made a reputation for carbonizing practices long before he left Salford. In the past half-year's accounts, it is seen that, compared with the corresponding period of last year, there has been a saving of no less than 4800 tons of coal, notwithstanding an increase in the quantity of gas sold of upwards of 16 million cubic feet, representing an additional 1400 to 1500 tons of coal saved. In other words, quoting the Chairman, there has been an actual increase in the quantity of gas sold per ton of coal carbonized of upwards of 1000 cubic feet. Think of that, and what it means! But those are not the only points over which Mr. Shoubridge, his staff, and men are to be congratulated. If we take the carbonizing wages and compare them with the sale of gas, it is seen that the past half-year's working has in this respect left the three London Companies far behind. The figure works out to 1·32d. per 1000 cubic feet sold, which is more than ½d. less than the Gaslight and Coke and South Metropolitan Companies, and more than ¾d. below the Commercial Company. The position is a proud one for the South Suburban Company; and it sets a point for friendly rivalry.

The Company have shown something else in the working; and this is that, under the conditions of London working, and using heavy charges of longer duration, it is possible to make, as Mr. Hunt describes it, "all-coal" gas of an illuminating power that complies with the standard of 14-candle power tested by the "Metropolitan" No. 2 burner. In view of this, he thinks the time is not far distant when Parliament might be again approached for a substantially lower standard of illuminating power than 14 candles. He has an idea that our legislators regard with benevolent eye a lower standard, inasmuch as one or two Chairmen of Parliamentary Committees have expressed views in this direction. We are not with him on that point. Just as one swallow does not make a summer, so the opinions of one or two legislators do not make law. The time is ripe; but Parliament, unlike Barkis, is at present unwilling. Whenever gas of a lower illuminating power than 14 candles has been mentioned in Bills in the last two or three sessions, the authorities of both Houses have shown a distinct disinclination to drop below the line defined in the model clause; and there has been a swift levelling-up to the 14-candle point. Still, there is no doubt that Mr. Hunt is fully convinced that the views of the Legislature are benevolent in this matter; but while that is so, it is "our own carbonizing methods "that have been somewhat lagging." We do not think Mr. Hunt suggests, though he gave conjunction to the two points, that carbonizing practice has ever entered into the consideration of the standard question by Parliament; their sole idea has been (mistaken though it now is) the consumers' protection in the matter of quality.

But better still than the lowering of the illuminating power standard would be, in Mr. Hunt's view, its abolition; and the substitution of a workable calorific power test. That is so; but we venture to predict that it will not be, in the first instance, through Parliament that the primary steps in the subversion of the illuminating power standard and test, and the setting up of a calorific power test, must be made. It has been through the London County Council that the first step has been taken in the application of a statutory calorific power test; and it is not at all unlikely that it will be through the Council, or rather with the support of the Council, that the next revolutionary step will have to be taken—that is to say, the setting up of a precedent for the abolition of the illuminating power standard. If there is one man who could effectively aid the gas industry to hasten the change from an illuminating power standard to a reasonable calorific power one (with variation according to local conditions), that man is Dr. Frank Clowes, the Chief Chemist to the London County Council. The article that he recently contributed to "The Times" Engineering Supplement shows there is very little difference between him and those gas administrators who think as Mr. Hunt does. In his article, Dr. Clowes says that there is still "a sufficient number of flat-"flame burners in use to make the illuminating power of "the gas, *at least for a time*, of importance;" and he adds that "possibly *at no very distant period*, the illuminating test may "lose even the *restricted* importance it at present possesses." The italicized words are healthy signs of Dr. Clowes' recognition of the position. A "restricted importance," however, should not stand in the way of a reform made possible and practicable by scientific advance; and this a scientist above all men should readily recognize. So long as those who are able to assist in this matter pander to the sluggards who will not alter their antiquated procedure, so long will progress be hindered.

The Show Gas-House.

THIS is an advertising age; and advertising pays in these competitive times. Some of the most old-fashioned of trading establishments, whose business has appeared in the past to have been founded on a rock, and to have needed none of the sustaining and stimulating methods of the modern trader, have discovered in more recent times, through the gradual sapping of their business, the necessity of applying the very methods that tradition and a conceit of their own security had aforetime led them to treat with contempt. Their mistake has meant loss, some of which cannot be retrieved, though method never so acute or attractive be adopted; and attention has had to be directed to "fresh woods and pastures "new." But in the form of advertisement, it does not do to get stereotyped. One can get old-fashioned, and the form become effete, in advertisement as in other things; and there must be change and novelty. And every change and the novelty must be of a kind not only to attract attention, but to induce patronage; for there are methods of advertisement that succeed in the former, but not in the latter. They fail in the most paying effect.

It is not difficult to apply these observations to the gas business. The need of advertising has not been so widely recognized by some gas administrators as it should be; but there will be an awakening sooner or later. In other cases advertising has been maintained at a high level; and, in those instances, new ideas are always welcome. The show gas-house is a new method of advertising. The show-room is as necessary to the well-being of a gas undertaking as the distributing-mains themselves. It is an essential for the consumers' convenience in making selection of fittings and appliances; but it is not by any means the best place for making effective demonstration. The best demonstration is that which is carried out under actual normal conditions. The interpretation of requirement in this regard has been made in one of their districts by the South Metropolitan Gas Company in the show gas-house, of which a description appears in another part of this issue; and we think what has been done there will commend itself as being worthy of acceptance and emulation by other gas undertakings. The house that the Company have fitted up with gas appliances is an ordinary dwelling-house, situated in an area in which building development is proceeding at a fast rate. It is furnished in every detail as a house of the kind should be for occupation, and fitted as every house may be with gas appliances—demonstrating from hall door throughout to top bedroom, the convenience, comfort, utility, economy, availability, labour-saving, cleanliness, constancy, and safety of the use of gas in the household. The house is furnished in a style that combines prettiness with utility; and the gas lighting and heating fixtures are of a kind that harmonize with the general scheme of decoration of each room, and, in fact, contribute to it. It depends where a show-house is situated as to the appropriateness in character of the furnishing; and, in no instance, should a show-house be furnished in so gorgeous a manner that the slightest impression of lavishness is conveyed to the visitor. That, gas as an economical

agent for lighting and heating must avoid in its demonstrations. On the other hand, mere pretence at furnishing would not be the slightest good. It would only end in disappointment to both visitors and the gas undertaking concerned. The novelty is in the real thing; and in the demonstration being conducted under normal conditions.

In fitting up a show-house, too, the choice of gas-fittings and other appliances must depend largely on the neighbourhood. Whatever the class of neighbourhood, let it always be remembered that the day of the old, plain, angular, eye-distressing fittings has passed, and that something of more ornamental merit for all situations in a house can now be obtained at a cheap rate. Something that pleases gives greater satisfaction; and satisfaction will induce greater care. In the fitting up with gas of the South Metropolitan Gas Company's show-house, as described in other columns, there is a completeness to which we do not think many householders will go. But that is not the point. The show-house is to demonstrate the possibilities of gas; and it is possible for every house to be fitted up with economical, useful, and artistic lighting, heating, and culinary appliances in precisely the way that this house is fitted. In the lighting, the bijou inverted burner has large part; but the upright burner is not neglected. The economy and artistic merits of the bijou inverted burners are demonstrated in all the reception rooms, in the hall, on the landing, and at other points. In respect of design and finish, the fittings themselves have been selected for the special purpose to which there has been application; and artistic silk shades have been utilized to complete the decorative effect. It is in the study of the details that full effect is obtained. The convenience of switch lighting is demonstrated in the hall, dining-room, drawing-room, bedrooms, and on the landing. Throughout the house, the heating is by gas-fires; and in conjunction with them the use of safety-taps is shown. Other little heating conveniences are found in the rooms. The hot water supply is provided by gas—either by the gas-heated boiler introduced into the hot-water circulating system, or else by ventilated geysers in the bath-room. For cooking, for the heating of a clothes copper, for clothes airing, for coffee roasting—for, in short, anything for which heat is required in the household, gas is used in this dwelling-house. It is not only a demonstration of the purposes to which gas can be applied in a dwelling-house, and of the efficiency for the various purposes, but it is a demonstration of how lighting and heating appliances should be fitted. It demonstrates something more; and it is that there is no occasion for the occupants of dwelling-houses being worried by consideration for the coal-cellar, and by the dust and dirt and labour created by solid-fuel fires. All this trouble is removed from the shoulders of the householder by the suppliers of gas. There have been gas engineers who have hoped to see the day when gas-works would be the light and fuel centres of every town. Final results and attainments are always better by having an objective beyond reach than by having one that is easily secured. If all houses were fitted as is this one of the South Metropolitan Gas Company, the aspiration of the gas engineers referred to would, it goes without saying, be *un fait accompli*.

This house is an educational treat; and it has already been, in the number of visitors who have passed through the rooms, a popular advertisement and demonstration. In the conduct of such a house, if popularity is to be assured, methods must be of the right order. The attendant must be courteous, painstaking, and discriminating. He will meet all sorts and conditions of people, as has the attendant among the hundreds who have inspected the South Metropolitan show-house. Every one of these visitors, whatever his station in life, can go away, if the attendant properly appreciates his duties, with knowledge that will be used to advertise, and so be an advantage to, gas. There need be no "touting" for orders from visitors. It is sufficient that they come, that they see, and that they understand. The orders will arrive in due season. If there is touting, it will prevent a large number of would-be visitors from making an inspection.

One point more, a show gas-house can only be an appendage of, though better apart from, the show-room. The house must not be lumbered up with a selection of goods from which consumers may make choice. That is a matter for the show-room; while the show-house is for the demonstration of what can be done with gas, and how it should be done, in a manner that householders can understand and appreciate. There is, however, no reason why the show-house in a large gas-supply district should be a fixture. Removals are conducted expeditiously and cheaply nowadays; and in most districts landlords are glad to let houses for short tenancies. People all over a large district will not go to see a demonstration in a part of the district in which they may not frequently be; so the show gas-house must go to the people, and impress its message and lessons upon them in their own neighbourhoods and amid their own circumstances. We think, where adopted, the show-house will prove a very effective advertisement for gas lighting, heating, cooking, and hot-water supply.

A Good Return from East London.

A REDUCED coal account, good manufacturing results, and an increased consumption of gas have, despite poor market values for coke and breeze, given the proprietors of the Commercial Gas Company an excellent account for the past half year, and one comparing well with that for the corresponding period of last year. The balance on the revenue account (£63,922) is £8948 greater than twelve months since; and though a smaller balance was brought into the past half year than into its relative of 1908, the amount available for dividend is £75,884, or an increase of £4571. Consequently, the same dividends can be paid, with a larger sum forward. Looking into the accounts, it is seen how much this prosperous condition is due to the manufacturing department, for (though in the variations of items from half year to half year rather more has been spent on balance in the other departments) the manufacturing department comes out with a reduction of £13,551—the aggregate expenditure having been £138,769. Coal cost less by £13,127; and, notwithstanding that more gas was made and sold, carbonizing wages were down by £1696. This denotes good working; as do also the facts that, though only 1570 tons more coal were carbonized, but 81,399 gallons less oil were used, the Company sold 36,233,000 cubic feet more gas in the six months—the total figures being 101,614 tons of coal carbonized, 1,198,601 gallons of oil used, and 1,587,975,000 cubic feet of gas sold. There is creditable showing here; and the Chairman (Mr. W. G. Bradshaw) will again have an opportunity of congratulating the Engineer, the staff, and the workmen on what they have accomplished. Their records are rising ones. The total expenditure (£200,891) is less by £10,705 than in the first half of last year. The receipts for gas amounted to £195,480; being an increase of £4541, which indicates an improved condition of affairs in East London, albeit there has not generally been any marked improvement in trade. The Company, however, have again good increases in prepayment and stove connections. The common tale is shown by the residual products receipts. There has in these quarters been a breaking-away by £7992; the total income for residuals having been £44,920. But coke and breeze more than account for the falling off, which means that the other secondary commodities gave rather better returns. The total receipts amounted to £264,813, which is a reduction of £1758. If this is deducted from the amount by which the expenditure is lower, the sum of £8947 is shown by which the transfer of £63,922 to net revenue account is better than it was a year ago. The proprietors will on Thursday regard the accounts in the best of lights.

Heat of Combustion and Illuminating Power of Gas.

The paper read by Mr. Arthur Forshaw at the recent meeting of the Institution of Gas Engineers added another chapter to the literature of a subject which the advent of the Welsbach burner brought into unusual prominence, and which has grown in importance with the development of the incandescent system of gas lighting. This innovation had the effect of minimizing the value of the illuminating constituents of gas, and bringing into greater prominence its calorific power. One of the earliest to investigate the new conditions under which gas was being consumed was M. Sainte-Claire Deville, the distinguished Chief of the Experimental Station of the Paris Gas Company at La Villette. Those of our readers who followed the proceedings at the meetings of the International Commission on Photometry held in Zurich in 1903 and 1907, as recorded in our columns, will be acquainted with the scope and results of his labours. They did not, however, reveal the full extent of his inquiries. This was done in the letter from him which was read by Mr. Shoubridge at the opening of the discussion on Mr. Forshaw's paper.

It then came out that as far back as 1894, when incandescent gas lighting was in its infancy, he undertook the systematic comparison of the heats of combustion of coal gases with the illuminating power in a Welsbach mantle, and found that the quantity of light obtained per 1000 calories used was practically constant for all gases. The notes of the experiments which led to this conclusion were never published, as they were regarded as the private property of the Paris Gas Company. In view, however, of his subsequent investigations, and of the interest aroused in the subject by Mr. Forshaw's paper M. Sainte-Claire Deville has presented to the Council of the Institution one of the few lithographed copies made of the notes of his earlier work, and obtained the necessary permission for their publication. In another part of the "JOURNAL" will be found a translation of the document, but without the appended elaborate tables and diagrams. The original will, however, we understand, be placed in the library of the Institution, so that it will be available for any member who wishes to obtain a fuller knowledge of its contents than he is able to acquire from the translation given elsewhere. It is not a little interesting, in view of recent legislation, to note that the author foreshadowed the production of a poorer and cheaper gas than that which was being supplied at the time his investigations were carried out, and the possibility of municipal authorities imposing upon gas companies a maximum and a minimum standard of calorific power for gas.

An Uninterrupted Success.

The Tottenham and Edmonton Gas Company do not appear to be within sight of any falling away of their remarkably high rates of increase. Last half year an additional sale of 8¼ per cent. was again metered. But there must, of course, come a time (though no one can put his finger on the period when it may be expected) when, as a percentage, the rate of increase must decline, because, as Mr. Corbet Woodall, in his address to the proprietors on Saturday, pointed out, a 5 per cent. increase on the business ten years ago represented about 25 million cubic feet, while to-day a 5 per cent. increase represents no less than 69 millions. There is no branch of the Company's private business that does not show an increase; and what is more, though the inverted incandescent burner is doing its work in reducing lighting accounts, the use of gas for other purposes is enlarging the average consumption per consumer, and particularly in the case of the prepayment consumers, who are now being supplied with cooking-stoves rent free. The result is that, though the price of gas was lower by 1d. per 1000 cubic feet in the past half year than in the corresponding period of last year, the gas revenue was £4500 more. Residuals, too, as things go, have done well; being only £275 below the figures a year ago. But this is due to tar and breeze—especially the former—showing up much better. The dividend—in consequence of the lower price of gas (it is now 2s. 5d.)—has gone up ⅛ per cent.; and the workers with this meeting have completed their first year of co-partnery. In regard to the working of the system all are well satisfied, excepting possibly the one or two men who have been discovered to be unworthy of not only being co-partners, but of working with co-partners. Among the points upon which congratulations are due to the Engineer (Mr. A. E. Broadberry) are that the additional quantity of gas sold has been met by a capital expenditure equal to £300 per million cubic feet sold, and that the whole capital now only represents £440 per million. Carbonizing wages, too, are down to 1·7d. per 1000 cubic feet sold, against 1·85d. twelve months since. The account is an excellent one.

Gas Supply in Scotland.

A few weeks ago there appeared in the "JOURNAL" the annual abstract of accounts of the Edinburgh and Leith Corporations' Gas Commissioners, for the financial year to May 15; and in another column of to-day's issue the report and accounts of the Glasgow Corporation Gas Committee, for the twelve months to May 31, are similarly dealt with. In both cases there has had to be recorded a falling off in the demand for gas; the decrease amounting in Edinburgh to 57 million cubic feet, and in Glasgow to about 285½ million cubic feet. The falling off in Glasgow is not, proportionately, to the make, so much greater than in Edinburgh as the figures would seem to show, owing to the fact that the total output is close upon three-and-a-half times larger in the former city than in the latter. To be exact, the decrease in the case of Glasgow amounts to 4·41 per cent.; and in explanation of it, the Gas Committee refer to the general depression of trade and the more extended use of incandescent burners. No doubt, adverse industrial conditions would make themselves the more keenly felt in Glasgow; but most places have suffered in greater or less degree from bad trade, and so it might well be that the smaller demand in Edinburgh also was brought about to some extent from this cause. The second reason advanced—that of the more general use of incandescent burners—is a factor which all gas undertakings have had, in their turn, to reckon with; and its influence has, of course, made itself felt in Edinburgh as well as in Glasgow. Such falling off as may have been traceable to this source has, however, been everywhere regarded with the most perfect equanimity, as it has been universally recognized that any present temporary setback arising from the more efficient results from gas which are rendered possible by the utilization of it in incandescent instead of flat-flame burners, is far more than counterbalanced by the magnificent future prospects which improved methods of consumption have given to gas undertakings. Therefore the position can be hopefully regarded—just as it has been in the cases of the numerous other concerns all over the kingdom which have had to report some falling off of business during the past financial year. The use of the incandescent burner is a development to be encouraged by every means in the gas manager's power—and it has been, and is being, so encouraged—because with it gas is still both the finest and cheapest method of artificial illumination obtainable. While as for trade depression, this is a matter which we all have to take as it comes. It is extremely probable that there never has been a period when general industrial activity, and the consequent employment of labour, did not vary from time to time; and it is equally probable that there never will be such a period. But to return from the general to the particular, it may be remarked that, owing to an increase in price, the Edinburgh accounts revealed a growth of revenue from the sale of gas to the extent of £2840, though the returns from residual products exhibited the falling off which has been so general a feature in connection with the last issued accounts of gas undertakings.

The Figures from Glasgow.

As already remarked, the decreased output at Glasgow in the financial year to May 31 amounted to 4·41 per cent.; and, of course, this would in any case have had a great effect on the revenue. The decline in the receipts has, however, been much larger than it would otherwise have been, owing to a reduction in the price of gas of 3d. per 1000 cubic feet. The gross revenue amounted to £864,210, as compared with £1,006,152 for the previous year; there having, in addition to the smaller receipts for gas, been a diminished income from residual products. As a matter of fact, considering the smaller demand for gas, the results of the twelve months' operations are—and rightly so—considered by the Corporation to be very satisfactory. Owing to the reduction in the price of gas, it was estimated by the department at the beginning of the financial year that the present accounts would show a deficiency of £26,000, which could be looked forward to without alarm, inasmuch as in the previous year there was carried forward a balance of £35,500. The actual result, therefore, which is a deficit of practically £9000, may be regarded as, in the circumstances, somewhat of a pleasant surprise—showing, as it does, that the year's working has turned out very much more favourably than the Committee had anticipated. It should be pointed out that the deficit exhibited in the accounts is £14,000; but the difference between this and the £9000 already referred to as the actual deficit on the year's working is explained by an extra depreciation of £5000 having been written off the mains, meters, &c., in the parishes of Cathcart and Eastwood, which were taken over from the Busby Gas Company during the year—this amount being estimated as the goodwill of the business thus acquired.

Increased Make per Ton—Decrease in Price.

The Committee's report contains one item that must be specially gratifying to the Engineer and Manager (Mr. Alex. Wilson) and his staff, and will also provide good news for the citizens. It is as follows: "The Committee observe with pleasure the much greater quantity of gas made per ton of coal carbonized, which was 10,015 cubic feet, as compared with 9522 cubic feet for the preceding year, an increase of no less than 493 cubic feet per ton."

This, however, is not the only item that will give satisfaction to the public; for the report also contained a recommendation by the Committee that, having regard to the result of the year's operations (there is still a sum of £21,500 to be carried to the credit of next year's profit and loss account), and to the fact that the coal required for the ensuing year has been contracted for on favourable terms, the charge for gas should be further reduced by 1d. per 1000 cubic feet. It is true that, when the report, and consequently the recommendation, came before the Council, a lengthy discussion took place on various points; but in the end it was proved that a very substantial majority of the members favoured the excellent proposal of the Committee to supply gas to the consumers generally on the most favourable terms that they feel they can afford to do. The reduction would be a welcome one at any time; but it is perhaps particularly so just when the demand for gas on the prepayment meter system—and therefore presumably on the part of the poorer class of consumers—is rapidly growing. It may be correct, as one councillor remarked, that "the citizens are not asking for a reduction in price;" but it does not from this by any means necessarily follow that they do not want one.

Passage of Gas in Vertical Retorts.

There has been a no small amount of controversy, some of it based on inconclusive considerations, in regard to the course taken by the gas evolved from the charges in vertical retorts. Those who have been responsible for the technical development of the Dessau system long since, from their studies and reasoning, arrived at the conclusion that the gas takes an inward course, and finds exit by way of the cooler parts of the charge; while those who would break a lance with them contend that the passage of the gas is between the inner retort surface and the face of the incandescent coke forming the outside of the charge. In an article in another column, Dr. Bueb meets those whose contentions, based chiefly on hypotheses, are opposed to the submission as to the ascension of the gas through the cool middle part of the charge. In this matter, Dr. Bueb has most engineers and chemists in this country with him; for the very fact that the gas does not undergo the extreme decomposition that is brought about by contact of coal gas with highly heated surfaces, producing unwelcome impurities and troubles, carries a weight of conviction on the side of his contention that cannot be disposed of by anything of a less material character. If his opponents still consider he is not right, then we await their explanation as to why the same chemical changes are not experienced in the vertical retort as are produced by contact of the gas with the heated surfaces of horizontal retorts and the incandescent top coke of the charge. As a matter of fact, if their views were correct, there should be in the vertical retort an accentuation of all that occurs in the horizontal retort with light charges, in view of the high temperature working with vertical retorts; but contrary and welcome effects are produced. The tests that Dr. Bueb describes in his article are not with gas volumes, charges, and temperatures on a working scale, but merely on a laboratory scale. The tests, however, are sufficient to prove how, by passing gas through comparatively thin layers of incandescent coke, its chemical composition is altered by the decomposition of the heavy hydrocarbons, and the gas is deteriorated. The article is highly interesting and worth study.

Borrowing Prior to Sanction.

Among the sins of municipal electricity departments has been the one of spending on capital account beyond their sanctions; and the Local Government Board are much irritated over the matter. Notwithstanding the repeated rebukes of the central department, local authorities have continued their financial waywardness in this respect; and there seemed no way of compelling them to a course of obedience and right-doing in this regard. But a legal declaration has now been made which should have some effect in keeping these authorities on the straight path. It was briefly alluded to on p. 270 last month, but deserves more prominent notice. The case referred to is one in which the Tottenham District Council are concerned. They have been erecting public buildings, and have spent more money upon them than was sanctioned. A large excess expenditure was incurred; and sanction to part of it—£4910—was refused by the Local Government Board. The result was an overdraft at the Council's bankers. The *denouement* has been an appearance of the Council before Mr. Justice Swinfen Eady, and a pronouncement by him that the Council are not at liberty to pay interest on the money borrowed without the sanction of the Local Government Board, that a sum of £855 so paid is illegal, as is also the overdraft itself. But what is worse for the Council, his Lordship has restrained them from making further interest payments, and from applying the general rates to liquidating the overdraft. If, however, the Council should become possessed of statutory authority to borrow the money, then they are not to be prevented by this judgment from paying the interest. One reason that authorities exceed the sanctions of the central authority is that they do not always know their own minds when starting on a scheme. Another is immature consideration; and a further one is that they hope, by this financial stratagem, to get some longer period for repayment—the extension being between the period of spending the money and the date of borrowing after receiving the sanction of the Local Government Board. These are only samples of the reasons that are advanced. We are glad to see the law on the side of straight dealing in connection with local finance; and an additional cause of pleasure is that Mr. Justice Eady has declined to allow the general rates to be applied to liquidating the overdraft. The next scene will be—unless the Council make an attempt, and successfully, to set aside Mr. Justice Eady's decision—a return to the Local Government Board on bended knee for relief from the perplexing position in which the Council find themselves. Anyway, what has occurred will undoubtedly have a good effect, not only in Tottenham but elsewhere.

For the Institution Council Room.

A very proper appeal is being made to members of the Institution of Gas Engineers. It will be remembered that at the recent meeting of the Institution, a portrait in oils of the late Sir George Livesey was exhibited. It was the work of Mr. Edward March, and had been purchased by the Directors of the South Suburban Gas Company for their Board-Room. The Council of the Institution, at the close of the meeting, had under consideration a suggestion that a replica of this excellent portrait should be obtained as a gift from the whole membership, for placing in the Council Room at the offices. The Council found that the amount required could be raised from subscriptions of about 2s. 6d. each; and therefore they are asking those members to whom the idea commends itself for a subscription not exceeding the small sum named.

South Metropolitan Company's New Chief Engineer.

The current number of the "Co-Partnership Journal" of the South Metropolitan Gas Company contains the following remarks by the Chairman (Mr. Charles Carpenter) on the recent appointment of Mr. Doig Gibb as Chief Engineer of the Company: "The greater proportion by far of the employees of the Company have their occupation on the engineering and not the commercial staff; and it is only natural that they should be most keenly interested in the appointment of its Chief Engineer. The choice of an efficient and suitable one has been a matter which has given considerable anxiety to the Directors and myself. What we should have preferred would have been that one of our own people had possessed all the necessary qualifications, and we were disappointed when we could not discover a person among us in whom age harmonized with ability. We therefore had to turn our thoughts beyond the pale of the Company; and our choice fell finally upon Mr. W. Doig Gibb, who is at present Chief Engineer of the Newcastle and Gateshead Gas Company, and who will take up his new duties at the beginning of October. We believe Mr. Gibb's qualities of heart will be as acceptable to the employees as those of his head, which have commended themselves to the Directors; and that all will find in him a strictly honourable, fair-dealing man, who can be relied upon to lend an attentive and sympathetic ear to those appeals to his judgment which I am happy to say are now so few and far between. To the young men in the service I would say this: There is no position which is not open to them if they will but qualify for it; and I do not mean by this that they must wait for or depend upon others for their qualifications. 'There is a tide in the affairs of men, which taken at the flood leads on to fortune;' but they must be ready when it is 'flood.'"

An interesting feature of the half-yearly meeting of the Newport (Mon.) Gas Company last Wednesday, a report of which appears elsewhere, was the presence of three veterans. The Chairman, Mr. Richard Laybourne, is 84 years of age; Mr. Henry Mullock, one of the Auditors, is 82; and Mr. J. Holehouse, one of the shareholders, is 81.

HEAT OF COMBUSTION AND ILLUMINATING POWER OF GAS.

It will probably be remembered that in the course of the discussion on the paper by Mr. Arthur Forshaw, M.Sc., on "The Illuminating Efficiencies of Carbon Monoxide and Hydrogen Used in Conjunction with Incandescent Mantles," at the recent meeting of the Institution of Gas Engineers, one of the letters bearing upon the subject which were read by Mr. Shoubridge was from M. Sainte-Claire Deville, the Chief of the Experimental Station of the Paris Gas Company at La Villette. In the course of his letter, he stated that as early as 1894 he carried out a series of researches on the combustion temperature of gas as affecting its illuminating power when consumed with an incandescent mantle. The results of these researches, to which the distinguished scientist referred again in his recent communication to the "Illuminating Engineer" (see *ante*, p. 109), have never so far been published, as they have always been regarded as the property of the Company in whose service they were obtained. In view, however, of M. Sainte-Claire Deville's subsequent investigations in 1901 and 1905, the results of which he laid before the International Commission on Photometry,* and of the interest aroused in the subject by Mr. Forshaw's paper, he has presented to the Council of the Institution one of the few lithographed copies made of the notes on his previous work, with the tables and diagrams accompanying them, and has obtained the necessary permission for their publication. As these notes constitute an early chapter of the history of this important question, we are pleased to be in a position to present to our readers the following translation of them.

VARIATIONS IN THE ILLUMINATING POWER OF AN AUER INCANDESCENT MANTLE, REGARDED AS A FUNCTION OF THE HEAT OF COMBUSTION OF THE GAS EMPLOYED.

Preliminary Observations.

Conditions to be Fulfilled in Order to Demonstrate the Effect of the Heat of Combustion on the Luminous Intensity of the Burner.

We have already learnt, as the result of previous investigations, that if a given volume of an average gas is consumed in an Auer burner, the useful effect—*i.e.*, the quantity of light produced by 1000 litres (35·3 cubic feet) of the gas—varies considerably according to the quantity of air admitted at the base of the bunsen burner, and that it is at its maximum with a certain definite proportion of air. We know, further, that if we repeat the experiment with a greater consumption of gas, we shall get a maximum useful effect corresponding, as before, to a certain proportion of air; but that this new maximum and this new proportion of air will be greater than in the preceding case. Their value increases with the output of gas. This is a particular instance of a general law which holds good for all luminous centres. The useful effect increases with the absolute importance of the centre. In the present case, it may be said that the useful effect of a given gas and a given burner increases with the absolute quantity of heat imparted per hour to the tissue of the mantle.

The only gases we have to study here are those produced by the ordinary distillation of coal or cannel; and it is a matter of experience that, with equal weight, they have all nearly the same heating power—viz., about 12,000 calories per kilogramme (say, 21,600 B.Th.U. per pound). Hence, if we wish to study the proper illuminating power of each of these gases when consumed with the Auer burner, we must carry out photometric tests on light-centres of equal absolute importance; and, in order to do this, it will be sufficient to burn per hour a similar weight of each gas. If we burnt the same volume, the difference between the quantities of heat given off by the rich and the poor gases would be too great, and the differences found between the consumption per carcel would be partly caused by the influence —extraneous to the question—of the importance of the light-centre. Moreover, it is evidently necessary that each gas should be placed in conditions which are most suitable to it, from the point of view of the proportion of air introduced at the base of the bunsen burner; and the only way to attain this end is to make use of a burner having an artificial air supply. This enables the operator to have always absolute control over the two outputs of gas, to measure them exactly, and to vary them in different ways, without having to alter the burner in any respect whatever.

Consequently, in principle, the course to be followed in carrying out the tests is this: The density or the heat of combustion of a gas being known, it is necessary to calculate the delivery suitable for consuming in one hour a given weight P of this gas, or for liberating the corresponding quantity of heat C. This having been done, the delivery of gas should be regulated to the figure found; and, proceeding cautiously, the proportion of air giving, under these conditions, the maximum amount of light should be sought. Finally, this maximum should be measured by comparison with the carcel lamp. The quotient obtained by dividing the intensity by the consumption, or inversely, will be the useful specific effect of the gas in the Auer burner.

In practice, it has not been possible to work so strictly, because the determinations of the density, heat of combustion, and luminous intensity of a gas can only be carried out simultaneously. Consequently, the consumption suitable for each case cannot be calculated in time to be useful. Operators have therefore been satisfied with making invariable the pressure at which the gas has been delivered at the inlets in the Auer burner No. 1, which was used for the trials; these orifices being those arranged by the maker with the view of the consumption of gas of average quality. Under these conditions, the consumption of rich and heavy gases remains very much below that of poor and light gases. The constant P or C is not strictly obtained; but as these quantities vary within only relatively narrow limits, the importance of the light-centre may be considered as practically negligible. It may therefore be admitted that the figures obtained in this series of experiments represent fairly well the variations in the consumption of gas, in the function of its calorific power, to produce the light of 1 carcel (that is, 9·6 candles), other things being equal.

Results of the Experiments.

Approximate Proportionality of the Specific Useful Effect to the Heat of Combustion.

Altogether, 42 samples of gas were dealt with. The poorest of them were those obtained at the end of the charge; their heat of combustion ranging from 4500 to 4800 calories per 1000 litres (500 to 533 B.Th.U. per cubic foot), and their illuminating power, with the bengel burner, varying from 150 to 180 litres (or 5·3 to 6·3 cubic feet to produce 9·6 candles). The richest gas was one obtained during the first hour of a charge of cannel coal of good quality. Its heat of combustion reached 9373 calories (1041 B.Th. U. per cubic foot), and its illuminating power, with the bengel burner, 53·66 litres (or 2 cubic feet to produce 9·6 candles). Grouping the averages of the results obtained with gases of fairly equal quality, and then making a curve of the variations of luminous intensity per 1000 litres ($I°/_{oo}$) in the function of the heat of combustion (C) per cubic metre, we get a line very slightly broken, which practically agrees with one having for its equation—

$$I°/_{oo} = 0{\cdot}00391\,C + 5 \qquad (1)$$

This line makes only a very slight angle with that which represents the strict proportion of the useful effect of a gas to its heat of combustion, viz.—

$$I°/_{oo} = 0{\cdot}00971\,C. \qquad (2)$$

It may therefore be concluded, without making a very great error, that the two quantities $I°/_{oo}$ and C are nearly proportional to each other.

The figures in the following table, calculated according to formula No. 1, show what would be the values of the useful effect in an Auer burner No. 1 of coal or cannel gases having a heating power between 4000 and 9000 calories per cubic metre (445 and 1000 B.Th.U. per cubic foot). Using the simplified formula (No. 2), we obtain the figures in the second table, which differ only very slightly from those given in the first one.

* See "Journal," Vol. LXXXIII., pp. 499, 567, 617; Vol. XCIX., pp. 574, 625, 684, 830; and Vol. C., pp. 22, 173.

No.	Heat of Combustion per Cubic Metre Moist, at 10° C. and 760 mm. (50° Fahr. and 30 in. Bar.).	Useful Effect.		Quantity of Air Admitted at Base of Bunsen Burner, per Litre (0·0353 Cubic Foot) of Gas.
		Quantity of Light per Cubic Metre (1 c.m. = 35·3 c.ft.).	Consumption of Gas per Carcel (1 Carcel = 9·5 Candles).	
	Calories.	Carcels.	Litres.	Litres.
1	4000	40·6	24·6	1·41
2	5000	49·6	20·2	2·40
3	6000	58·5	17·1	3·37
4	7000	67·4	14·8	4·39
5	8000	76·3	13·1	5·28
6	9000	85·2	11·7	6·32

No.	Heat of Combustion per Cubic Metre Moist, at 10° C. and 760 mm.	Useful Effect.	
		Quantity of Light per Cubic Metre.	Consumption of Gas per Carcel.
	Calories.	Carcels.	Litres.
1	4000	39·6	25·2
2	5000	48·6	20·5
3	6000	58·3	17·2
4	7000	68·0	14·7
5	8000	77·7	12·9
6	9000	87·4	11·4

Variations in Useful Effect as Affected by the Heat of Combustion of any Gas Consumed in an Ordinary Auer Burner with Natural Air Supply.

Whatever interest the foregoing results may possess from a theoretical point of view, they can only be obtained by using the burner having an artificial supply of air; and they give no idea of those obtained in practice with burners having only the natural supply of air. In order to solve this problem, it was advisable to ascertain by experiment the variations in the luminous intensity and useful effect, when consumed in a No. 1 Auer burner as usually made, of a number of gases varying considerably in richness. These experiments were carried out at the same time as those already described, and with the same gases. The burner with air supply was so arranged that the simple detachment of the india-rubber tube conveying the air from the special holder was sufficient to convert it at once into an ordinary No. 1 burner. This operation was performed immediately after the principal test. Then the consumption of gas was so regulated as to obtain the maximum useful effect compatible with the natural supply of air under the influence of the drawing action of the jet of gas; in other words, the practice was followed of a consumer seeking to regulate his Auer burner to its utmost efficiency by means of a single tap. This regulation was comparatively easy when using a No. 1 Auer burner, since the maximum useful effect almost coincides in this case with a very apparent maximum absolute intensity. The following are the results:—

Characteristic Properties of the Gas Tested.		Results Obtained with a No. 1 Auer Burner with Free Air Supply.			
Heat of Combustion per Cubic Metre of Moist Gas at 10° C. and 760 mm.	Consumption per Carcel in a Bengel Burner (Moist Gas at 10° C. and 760 mm.).	Pressure of Gas.	Consumption of Gas per Hour.	Absolute Luminous Intensity.	Consumption of Gas per Carcel.
Calories.	Litres.	Millimetres.	Litres.	Carcels.	Litres.
4000	204·8	64 0	110·9	4·508	24·6
5000	134·2	46·0	86·2	3·960	21·8
5500	115·6	39·0	74·8	3·723	20·1
6000	101·1	34·0	65·8	3·522	18·7
6500	89·4	29·5	58·2	3·321	17·5
7000	80·5	26·0	52·0	3·139	16·5
8000	67·3	22·5	46·4	2·847	15·6
9000	57·8	20·5	39·5	2·628	15·0

It will be at once seen how these figures differ from those obtained when consuming each gas in a burner suitable to its richness.

The ordinary Auer burner, constructed for consuming an average gas, gives very satisfactory results with coal gases which are poorer than the regulation gas of Paris. All that would be necessary, however, would be to enlarge very slightly the gas and air orifices to enable it to burn, at the usual pressure and under the best conditions, 110 litres of coal gas of 4000 calories per cubic metre with an absolute luminous intensity of upwards of 4·5 carcels—a duty superior to that furnished, on an average, by the No. 1 burner. It is true that from 24 to 25 litres of this gas would be consumed per carcel, instead of only 18 or 20 litres; but this increase would certainly be compensated for by the reduction in price which would result from the general adoption of a gas of this low quality.

On the other hand, we see that the Auer burner, as constructed to-day [1894], is altogether unsuited to the good utilization of very rich gases. When they are burnt with it, their useful effect does increase a little, but in relatively limited proportions. With regard to absolute intensity, it decreases with the richness of the gas—to such an extent, indeed, that in an establishment lighted with the Auer burner people see less clearly if the gas is enriched, and conversely. We consequently arrive at what appears to be a somewhat paradoxical conclusion—viz.: When the Auer burner as at present made shall come to be generally employed for lighting, municipal authorities will doubtless be led to impose upon gas companies a maximum heat of combustion, in the interest of lighting; but this will not prevent them from also imposing a minimum, in view of the employment of gas for heating and the production of motive power.

The question thereupon arises: Could the Auer burner be easily modified with the view of its consuming very rich gases with the maximum useful effect they are capable of producing, and with an absolute intensity at least equal to that now obtained? *A priori*, this appears doubtful. At all events, it is very certain that, if the general adoption of incandescent lighting renders plausible evolution towards a kind of gas poorer, but also cheaper, than that now supplied, there can be no question of the change in the opposite direction.

In bringing these notes to a close, it must be borne in mind that what has been said refers only to gases resulting exclusively from the distillation of coal or cannel—gases in which the calorific power per kilogramme tends rather to increase when one passes from the richest to the poorest of them.

Conclusions.

1.—Other things being equal, the consumption per carcel in an Auer burner varies almost precisely in inverse ratio to the heat of combustion per cubic metre of the gas burnt—in other words, the quantity of light which may be produced with 100 litres (3·53 cubic feet) of gas is proportionate to the heat of combustion of the cubic metre of gas.

2.—This law is only demonstrated experimentally in the case of gases resulting exclusively from the simple distillation of coal or cannel—gases which, in fact, all possess very nearly the same calorific power (about 12,000 calories) per kilogramme.

3.—In order that this may be verified, only light-centres of the same absolute importance should be compared one with the other—that is to say, the hourly consumption of each gas must be so regulated that the weight or the heat given off per hour is very nearly equal for all the gases.

4.—Further, each gas must receive at the base of the bunsen burner the proportion of air which is best suited to it. This proportion is a progressive function of the heat of combustion. If the latter exceeds from 4000 to 8000 calories—*i.e.*, varies from 1 to 2—the proportion of air will increase from 1·41 to 5·28, or from 1 to 3·7.

5.—If, leaving these prescriptions out of account, the different gases are burnt in the same ordinary Auer burner, simply regulated for the consumption of the quantity of gas giving the best useful effect, it is found (*a*) that the absolute intensity diminishes in proportion as the calorific power increases, and that when this exceeds from 4000 to 8000 calories, the absolute intensity falls from 4·5 to 2·8 carcels; (*b*) that the intensity per 100 litres of gas increases, but to a much less extent than under the conditions previously defined.

6.—It results from this that if, in ordinary practice, relatively poor gases give the light of one carcel with a consumption slightly higher than those which are relatively rich, they are, on the other hand, capable of furnishing a slightly greater absolute quantity of light.

7.—All the experiments were made with a No. 1 Auer burner; but the results obtained would probably not have been different with a No. 2. The determinations might, however, have been much less precise, owing to the difficulties this burner presents for regulating the combustion to the conditions of the maximum useful effect in each case studied.

Appended to the notes are details of all the experiments, both with and without artificial air supply. In the case of each gas tested, particulars are furnished in regard to its

illuminating power, according to the method of Dumas and Regnault, and to its specific gravity and volumetric composition. But M. Sainte-Claire Deville states that they are given merely for information, and without comment.

The experiments were made over a period extending from May 18 to July 15, 1894; the gas being produced in a setting of seven retorts charged regularly one after the other with coals from various sources. The distillation period of four hours was divided into eight phases of half-an-hour; and a sample of the gas produced in each phase was taken off and stored. The gases studied were divided into seven groups, according to their heat of combustion, which ranged in the case of coal gas from 4000 to 7500 calories; the two cannel gases having heating values of 8526 and 9373 calories respectively.

The results of the elaborate experiments dealt with in the notes are tabulated under 24 headings. The first five give the heat of combustion per cubic metre of gas and per kilogramme of coal, its regulation illuminating power, as tested by the bengel burner, and its specific gravity. The next eight columns show the volumetric composition of the gas and its content of benzol. Following these are six columns giving the results of the investigations into the specific useful effect of the gas consumed in a No. 1 Auer burner having an artificial air supply. The remaining columns furnish similar particulars in regard to gas consumed in a burner of the same type, but with free air supply.

OBITUARY.

The death occurred on the morning of the 29th ult. of Mr. J. L. Hollis, J.P., ex-Mayor of Windsor, and Chairman of the Windsor Royal Gas Company. Deceased was in his 67th year.

Mr. John P. Scott, the Manager of the Bridge of Allan Gas Company, died very suddenly on Wednesday last. He left home in his usual health to attend a funeral in the town. On arrival at the place, he was seized with illness. Friends drove off with him to the residence of a doctor; but he died on the way. Mr. Scott was a highly respected man in the community. He has left a widow.

We regret to announce the death last Friday, at his residence in Upper Tollington Park, N., of Mr. Joseph Mackay, in his 81st year. Mr. Mackay had since 1858 been closely connected with the gas-meter trade, having originally been with Messrs. Croll, Rait, and Co., afterwards the Gas-Meter Company, Limited. Owing to failing eyesight, however, in 1902 he had to retire; and in consideration of the long and faithful services he had rendered to the Company, the Directors pensioned him off at full salary. Mr. Mackay was a Director of the City of Chichester Gas Company from 1893 to 1901, when he resigned. Mr. Kenneth R. Mackay succeeded to his father's position with the Gas-Meter Company, and still holds the appointment. Another of the sons, Mr. J. Watt Mackay, is Assistant-Engineer of the Shanghai Gas Company.

The "Journal für Gasbeleuchtung" reports the death, on June 30, of Herr Christian Reithmann, sen., of Munich, in his 92nd year. Deceased was the son of a clockmaker in Tirol; and, desiring to have a cheap and ready source of power for driving small mechanical appliances, he designed in 1852 a gas-engine (with electrical ignition) consuming a mixture of hydrogen and air. In 1856, he replaced the hydrogen by coal gas as then supplied to Munich. He subsequently improved this early gas-engine; and in 1873 he made it a four-cycle engine with compression, such as is now widely used for industrial purposes—especially in the propulsion of motor-cars. For his inventions in connection with the development of the gas-engine, he received recognition at the Paris Exhibition of 1887, and on other occasions subsequently.

At their meeting last Wednesday, the Bolton Town Council confirmed the Gas Committee's selection of Mr. W. J. Smith, B.Sc., of Carlisle, as Gas Engineer and Manager, in succession to his father, at a commencing salary of £500, rising by yearly increments of £25 to £600 per annum.

Cooling jacket water which is to be employed again for gas-engine cylinders can be utilized at small cost by a construction described in an article in "Power and the Engineer." It consists of a sheet of corrugated iron placed in such an inclined position that the valleys of the corrugations form troughs which hold a shallow layer of water, so that the water flowing down over the sheet is further cooled by being retained in the corrugations or by mixing with the cooler water in them. The device is set up against a wall out of doors, as near the engine-room as possible, and preferably in a shaded place. Water is supplied at the top through a perforated pipe. The bottom corrugation ends with a downward curve, so that the water will flow off in a sheet, and not tend to creep back on the iron and spatter. An outlet-pipe of concrete or an old drain-pipe at the ground surface catches the discharged water and carries it to a sump.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 406.)

Business on the Stock Exchange last week was quiet, as is only to be expected when we are fairly into August. But for all that, the general tone was quite favourable on the whole, thanks to one or two factors which were made the most of. The six-hour surrender of the coal mine owners was hailed as if it portended a lasting peace; and official despatches full of good things from Spain were warmly welcomed. Perhaps in neither battlefield have we seen the worst. However, in Capel Court the sun shone gaily again. The opening day was one of fair promise. The gilt-edged division was firm, and Consols rose ⅛. Home Rails recovered; but the closing prices were below the best, and most departments were fairly firm. The tone continued good on Wednesday in the absence of any bad news. Consols rose further; and the rest held their own well. Good buying business on Thursday again supported Consols. Railways were, however, rather weaker; and some of the speculative markets gave way. Business fell very quiet on Friday, but did not suffer from the usual Friday realizing. Consols improved again. Railways were steadier, and there was an upward move in Americans. The good tone lasted through Saturday, though business was most inactive, and the week closed well. In the Money Market, there was an abundant supply at easy rates. Discount held pretty firm until nearly the close, when it was inclined to give way. Business in the Gas Market was quite active, especially in Argentine undertakings, owing to the announcement of terms arranged for amalgamation; River Plate being prominent and advancing freely. The half-year's accounts issued show that home undertakings in general have been doing well. Some have increased their dividend, others could do so had they not attained their authorized rates, and a goodly number announce reductions in price. Business in Gaslight and Coke ordinary was brisk at from 104⅜ to 105⅜—a rise of ¾. In the secured issues, the maximum made 89, the preference 106 and 106¼, and the debenture 85¾. South Metropolitan was very quiet at 123½ and 122½—a fall of 1; and the debenture marked 85¼. In Commercials, the 3½ per cent. was done at 105⅛, and the debenture at 82 free. Among the Suburban and Provincial group, Brentford old marked 256½, British 43¼ and 43⅜, Ilford debenture 103¾, and South Suburban from 121 to 121⅞. In the Continental companies, Imperial made 179 and 179¼, ditto debenture 96¼, Union from 96⅝ free to 97¾, European fully-paid 24½ and 24⅝, and ditto part-paid from 18 7/16 to 18¾. Among the undertakings of the remoter world, Bombay changed hands at 5¾ to 5 13/16, ditto part-paid at 4 1/16, Buenos Ayres at from 13¾ to 13 15/16, ditto debenture at 95, Melbourne 5 per cent. at from 102¼ to 102⅝, Monte Video at from 12½ to 12⅞, Primitiva at from 7 1/16 to 7 3/16, ditto preference at from 5¼ to 5 7/16, River Plate at from 15⅝ to 16 1/16, and ditto debenture at 97 and 97½.

ELECTRICITY SUPPLY MEMORANDA.

Necessity of Obscured Metallic Filaments—Barbarous Shop Lighting—Roadway Obstruction—A Gas Company Steps into the Breach—Power and Profits—Depreciation and Income-Tax.

The other week there appeared in the "Journal" a review of a book by Mr. Borlase Matthews, entitled "Electricity for Everybody," which review (though it has not gained the author's approval) stands uncontradicted in any part. In the book, it was noticed that Mr. Matthews referred to metallic filament lamps, and stated that "owing to the extreme brightness of the higher candle-power lamps, complaints are sure to arise to the effect that the eyes of the user are strained." Also that 100-candle power naked filament lamps "at short range may be painful and even dangerous." Reminder of these remarks is given by an editorial article in the "Electrician," on "Physiological Effects in Illumination." Our several contemporaries of the electrical world have not yet come to any settled views on this subject. One week they laugh at the warnings and declarations of scientists on the subject, and clothe the electric incandescent lamp in all the finest of harmless characters. Another week, this levity is changed to gravity. The "Electrician" approaches the subject seriously. The article on "Physiological Effects in Illumination" opens by saying: "Those who have the improvement of illumination at heart, not merely from the artistic point of view, but from that of optical hygienics, will have noticed a very unfortunate, not to say retrograde, movement since the advent of the metallic filament lamp." This introduction shows that our contemporary is in a serious frame of mind. The article proceeds: "A few years ago carbon lamps, although generally used with clear globes, were more often than not surrounded with shades which prevented the filament from coming easily into the field of view. As soon as the economic possibilities of the new lamps were appreciated, these carbon lamps were in many cases replaced by metal filament lamps, the shades being left unchanged. The earlier types of metal lamps were made with more or less obscured bulbs. It is noticeable, however, that lamps with clear globes are now used more frequently; and as these are fitted in the old shades, which were made for very much smaller lamps, the result is that the metal filament is left generally quite un-

obscured. *The effect on a sensitive eye is painful, and in any case must be bad, considering the high intrinsic brightness of the metal filament as compared with the carbon.* It might have been thought that the frosted type of lamp would have been adopted pretty generally; but contractor and consumer alike seem to pay no attention to this point, and we suppose *they will continue this course until optical troubles arise.* This is the more inexcusable because a little loss of efficiency is unimportant; and the general effect of using frosted bulbs with metal lamps is to give the sensation of higher illumination, which, after all, is the condition at which we should aim." But the loss of efficiency would at once alter the basis of comparative calculations. However, there is agreement with our contemporary. Many conversions that have taken place, and have come under observation, from carbon filament lamps to metallic filament ones, in both shop windows and for domestic purposes, have produced something that is not only (to use our contemporary's own expression) "painful," but something that is positively hideous. Persevere in this. It is a useful factor in the competition.

It is also interesting to notice a change of view regarding the use of unscreened high-power lights close to the pavement for the illumination of shop windows. Electrical engineers in their fight for this lighting have been largely responsible for this solecism in illumination. They seem to eschew all intelligent application of lighting to purpose, for the sake of getting the largest electricity consuming appliance installed. Perhaps it is thought that, from the business point of view, greater intelligence is shown in this manner than by the more rational treatment by lower consumption lamps. Our much respected friend, Mr. Borlase Matthews—who, in his book on "Electricity for Everybody," has told us more about the vile, evil, injury inflicting, and strength sapping effects of gas when used in shops, than we have ever found out before after a lifelong study—is of opinion that brilliant lighting should not be left by the shopkeepers to the gin palaces; but there is no general agreement as to the correctness of this advice. A writer in the "Industrial Supplement" of the "Electrician" has a distinct leaning towards modifying the rage of electricians for suspending flame arcs a few feet above the footpath. While he agrees that a "favourite" method of illuminating shop windows is by suspending outside the establishment powerful lights which are shaded (sometimes) on the road side, but which throw an exceedingly bright light on the goods displayed, he says "another, and even better, method is to light the window from inside; ordinary incandescent, or, rather, metallic filament, lamps, being used for the purpose." Even, then, such lights should be shaded on the roadside, as there is nothing more distressing to an inspector of goods placed in a shop window than to have these lamps on a line with, or in close proximity to, his eyes. When they are thus hung, inspection speedily terminates. In this, the writer in the "Electrician Industrial Supplement" is in accord with us. He says: "In spite of the advances that have recently been made in the study of the science of illumination, it is distressing to see how little the knowledge thus acquired has filtered through to the ordinary consumer or been put into practical use by him. Only too often is a shop window lighted in such a way that the lamps glare into the eyes of the prospective customer, and prevent the wares displayed being properly seen. The fact that this method is not infrequently used by the smaller optician is not without a touch of humour. . . . To walk along one of the principal streets in comfort at the present time really requires a pair of blue spectacles, though there should be no need for this if the illumination were carried out in a scientific way." We agree. There is a large amount of missionary work to be done among central station engineers, who do not care to see a diminution in the lighting accounts of their customers.

Not long since our good contemporary the "Electrician" was in a state of great dudgeon over the fact that, at the commencement of the overhead street lighting by high-pressure gas-lamps in Fleet Street, a tower ladder was employed of a somewhat more cumbrous type than was necessary, during the daytime. Public inconvenience and a few other charges of a more paltry character were brought against the offending tower ladder; and, with eyes upturned, our contemporary was thankful that with the centrally suspended electric flame arc lamps in Cannon Street, there was no such daytime inconvenience to either pedestrians or road traffic. The electricians did their trimming, we were told, during the small hours of the morning, when all respectable people—except those who were engaged providing the daily news for the country and the daily provender for London's myriads—were asleep. After these reproaches of the temporary gas methods and the homage paid to the ways of our electrical friends, it was not without surprise that, on passing along Cannon Street on the afternoon of the 30th ult., we found, just at the important point where Cannon and Queen Streets intersect, a tower ladder blocking the road traffic—when cabs and other vehicles were exceedingly busy in the City in view of the approaching holiday—for the purpose of giving attention to a flame arc lamp. How many of the other lamps had called, or would afterwards call, for the use of this impediment to vehicular traffic cannot be said, as more time than was occupied in watching the operations at this one lamp, and the efforts of a policeman to keep the traffic on the move, could not be afforded. If there is inquiry into the truth of this allegation, and into the dimensions of the tower-ladder, and the space of the roadway occupied by the obstruction, we shall hope to see, in the interests of justice and fair play, our contemporary girding those who were responsible for this interference with the traffic at such an important point, and at such an important hour. When the original Fleet Street tower ladder was the subject of anathema on the part of our contemporary, something was said about mediæval times, and about a good many other things. If what was said fitted Fleet Street lighting at one time, the criticism will fit Cannon Street now; so let us have it, with any additions that the honour of electricity demands.

Last week comment was passed on the subject of local electricity supply undertakings feeling keener than ever the competition of private electric supply plants, for considerable installations of lighting. The danger is a present one, and likely to be in its effects a progressive one. It was a bitter pill that the Hastings Corporation had to swallow a few months ago when they found that, so it was said, the capital cost of laying a cable to the St. Leonards pier, to meet the demands of an American Entertainment Syndicate, would be such that a contract could not be entertained that would bring them in any profit. It is notorious that the Corporation have had sad experience of throwing out long and expensive lines, and getting few bites and unprofitable business at the other end. There must be a limit to this sort of thing, if the administrators of electricity undertakings are not desirous of impressing people with the notion that they have run completely mad. The Hastings Corporation were wise—on this occasion; and we are pleased, by way of change, to be able to applaud an action of theirs in connection with their electricity supply undertaking. But there was no need for the American Syndicate to go without electricity if they wanted it. While the Corporation were struggling with the adverse circumstances in which they found themselves, the Gas Company came to the aid of the Syndicate with a private electric generating plant driven by gas-engine. To-day, the pier is lighted by this plant with myriads of electric lamps and gas-lamps at cheaper cost than the Corporation could have done it for; and there is universal satisfaction at the brilliance of what has been accomplished. But a second important point is that the American Syndicate have an insurance in having the gas supply at hand, as well as the electricity supply from the private plant. The demonstration as to cost, and the protection of gas, will not be lost upon other large consumers in the district, who know, by recent painful experiences, that it is not at all a bad thing to have, in the matter of lighting, two strings to one's bow, when the principal lighting medium is electricity.

It is a long lane that has no turning; and it is a tremendous long lane that some of the electricity power companies are now traversing to reach the dividend-paying point. Electricity supply wants peculiarly favourable areas to make a really paying thing of it. Otherwise, it is better for investors to put their money into some other business that will give them a quicker, better, and more certain return. The Newcastle-upon-Tyne Electric Supply Company has been held up as the paragon of a power supply company. It has been quoted in parliamentary committee rooms, and has been taken as a model of all that is righteous in a power company. It has a specially fine district—a district unequalled in opportunities for a power concern. Alas! the Directors have declined to recommend an interim dividend on this occasion on the ordinary shares, though there is a remainder of profit, after satisfying all prior claims, to provide a "small" one. But "the Directors consider that, in view of the critical position of the coal trade, and the great stoppage and damage to other trades which may result therefrom, it would not be prudent to deal with the balance before the end of the financial year." The balance, be it noted, is only sufficient for the payment of a "small" dividend. What a fortunate thing the Directors got out their report before peace was declared in the coal world. They would have had one excuse the less for not paying a dividend had they been but a little later.

The question of allowances for depreciation in assessment for income-tax is one in which gas undertakings have been concerned; and therefore it will not be without interest to refer to what has resulted in this matter from protracted discussion between Somerset House and representative electrical bodies. It has been decided, in respect of cables, that, in addition to repairs, allowance for depreciation may be granted at the rate of 3 per cent. per annum on the written-down value. On all other plant (exclusive of loose tools, meters, and office furniture) depreciation may be allowed at the rate of 5 per cent. per annum on the written-down value, in addition to the cost of repairs. As to conduits, no allowance should be made for depreciation; but annual expenditure on repairs and renewals may be allowed as working expenses as and when incurred. Respecting meters, loose tools, and office furniture, no allowance should be made for depreciation; but annual expenditure on repairs and renewals may be allowed as working expenses as and when incurred. "Written-down value" is defined as meaning original prime cost, *plus* subsequent additions, less all allowances actually granted in respect of wear and tear. The Council of the Incorporated Municipal Electrical Association consider the allowances for depreciation inadequate in assessing for income-tax; and it is held that full regard should be given to the periods allowed by the Local Government Board for repayment of loans in respect of similar assets. What a singular thing! For years we have been listening to municipal authorities arguing that no special depreciation provision is necessary in their electricity undertakings, seeing that the repayment of the loan is quite sufficient as the equivalent of depreciation. If they are right, what they have to grumble at in the allowances granted, is not altogether clear. But there are platitudes that would fit the position—such as circumstances alter cases, and some folks are never satisfied.

NOTES FROM WESTMINSTER.

THE Gaslight and Coke Company Bill has had its third reading in the House of Lords; and now only awaits the Royal Assent. Its progress through the Upper House has shown the direct opposite of the pace at which it went through the House of Commons. But this might not have been the case if a member of the labour party had been translated to the Lords—Mr. William Thorne for example. He has said some harsh things about the Lords in his time; but now he sees how inconvenient it is for the Socialists to be unrepresented there.

Glamorgan Water Scheme Rejected. The closing days of last month witnessed the parade of the evidence *pro* and *con* the Glamorgan Water Board scheme before the House of Lords Committee, over which the Earl of Kintore presided. It was all very similar to that heard a few weeks previously when the measure was before a Committee of the Lower House. Briefly, the Bill was promoted by the County Council; but it did not deal with the whole county, though the whole county was booked to supply the financial security. The object of the Bill was to ensure, through a Water Board, the water supply to large areas of the county in the future. Among the proposals was the taking over of five water undertakings and the sources of supply of certain local authorities, and to make necessary extensions of works and fresh provision of water. Mr. Reginald Middleton was the Engineer to the scheme. The county, however, was not unanimous in the matter. There was a good backing; but several local authorities and companies wanted to be excluded from all participation, financial or otherwise. Much evidence was given; but it is altogether complicated, and somewhat uninteresting for those who are not locally concerned. The Committee tried to focus consideration on the two points as to whether the scheme was workable, and whether it was equitable to all interests. Apparently midway in the proceedings they did not think it was, for the Chairman announced that they noticed that the whole Administrative County was to be brought in as collateral security, although quite two-thirds of the county did not agree to the scheme, and friction and expense in the future seemed unavoidable. The Committee felt that the areas of the Rhymney and Aber Valley Gas and Water Company, and of the Borough of Neath, should come out of the Bill; and that the consent of any outside authorities intended to be included thereafter must be obtained as a necessary preliminary to an application for a Provisional Order. This cleared the ground considerably; and the evidence proceeded. But in the end the Committee were unanimously against the measure, though they were far from thinking that Glamorganshire will not some day require a comprehensive scheme for the provision of an increased supply. Through the Chairman, the Committee made courteous reference to the ability that leading Counsel had shown in conducting the complicated case, and in rendering assistance to their Lordships. Such an acknowledgment is not often made in the Committee rooms.

Cardiff Water. The water section of the Cardiff Corporation Bill was opposed in the House of Lords on the point of outside charges; the Committee considering the matter being that sitting under the chairmanship of the Duke of Northumberland. The Llandaff and Dinas Powis Rural District Council were the only opponents. Engineering evidence was given by Mr. C. H. Priestley, the Corporation Water Engineer. According to his explanation, the Corporation want parliamentary sanction to construct a reservoir larger than the two at present existing. The capacity of the new reservoir will be about 725 million gallons; and the estimated cost of the scheme is £272,000, including land. It is calculated that the available storage will then suffice for thirty years. But the opposition was directed entirely against the outside charges. By the Act of 1884, the Corporation are permitted to charge outside any sum not exceeding 25 per cent. more than is charged for water within the borough. The decision of the Committee was that this should be continued until Jan. 1, 1919; afterwards the excess charge to be reduced to 12½ per cent., with a corresponding reduction for water supplied in bulk.

Greenock Water Charges. The question of charges was also raised before the same Committee in connection with the Greenock Corporation Bill; but the proposals in the measure were allowed to pass. One of the principal is in connection with twenty or so charitable institutions, which have been exempt from charge. It is now proposed to levy a rate on them; and while in the Commons the Corporation agreed to give the institutions concerned a rebate of 25 per cent. for five years, and 12½ per cent. for the succeeding five years. The Lords Committee have left this clause as it stood when the Bill passed from the Commons.

Outside Electricity Supply. It transpired when the Watford District Council Bill came before a Committee of the House of Lords the other day, that an agreement had been arrived at with the Gas Company, who were hostile to the Corporation being authorized to supply electricity outside their area. The Bill proposes an extension of the limits of the electricity supply area in order to take in Cassiobury Park, and to furnish electricity outside the area in the event of consumers desiring a supply. The Board of Trade, in a report, referred to the provisions of the Electric Lighting Acts (Amendment) Bill now before Parliament, in which it is provided that authorities desiring to give a supply outside their own district must obtain an Order so to do from the Board of Trade. The Gas Company desired the Council to take this clause from the Board of Trade Bill, adding the limit of 500 yards, which, in the case of Watford, is confined to the area around the town in which the Council desire power to supply. To this the promoters assented.

A MODEL GAS LIGHTED AND HEATED HOME.

A Surprise Visit.

WHEN walking from Catford down the Bromley Road towards a district known as Southend, an erection on a neat grass plot in front of a house that bears all the attractive features of a suburban villa residence, arrested the attention of the writer the other day. This erection is a large framework of tubing, with wrought-iron ornamentation, and glass front and back, forming a large rectangular box. On the front of the case, in prominent lettering, runs the announcement:

ESTATE SHOW-HOUSE.
LIGHTED AND HEATED BY THE
SOUTH METROPOLITAN GAS COMPANY,
FURNISHED BY
CHIESMAN BROTHERS, LEWISHAM.

This is no pigmy looking sign that seems afraid of causing resentment by obtruding itself upon public notice. It has a mission to perform. A conspicuous object by day, it is a still more conspicuous one when illuminated at night time by incandescent gas-burners, controlled by switches in the hall of the house. The announcement is intended to be such that even those who run may read, whether it be day or night; and it succeeds in its purpose. The writer ventured up the pathway to the house. By way of change, it was a warm, and fairly bright day; and the door stood invitingly open, showing a hall furnished in homely fashion. A brand new door mat, with the word "Welcome," in black letters, woven into its khaki body, gave encouragement to enter; and immediately the affable attendant came forward (whom it afterwards appeared was one of the South Metropolitan Company's district officers), and expressed the pleasure he would have in showing his visitor round. He knows his business. That the writer was in a position to judge; and he did not spare himself by slipping over the detail, or in any way showing an inclination to discharge his duty in a perfunctory manner.

One was soon on friendly terms with the attendant; and it was ascertained that the Gas Company have gone into this piece of enterprise in connection with a considerable building development, known as Watt's Estates, upon which road after road is being opened up, and flanked on both sides by new houses. It is a big thing; and the Gas Company have gone into the very midst of this new property, and fitted up the house as a house of the kind may be fitted up for lighting, cooking, and heating—to serve convenience, comfort, and utility, and at the same time to add to the decorative effect of a home, at reasonable expense. The work is well done. The house serves not only the purpose of being of assistance to incoming tenants on the estate, but, being situated in the main road, many passers-by turn in to make an inspection, and the Company are so catholic in their ideas that visitors are welcomed even though they are not resident in the Company's district. It is a case of "throw thy bread upon the waters," &c. Nor are visitors worried for orders for gas-fittings. The fitting-up of the house is intended to supply, under realistic conditions, a demonstration of how the services of lighting, cooking, and heating should be, and can be, performed by gas—economically and effectively. The whole of the light and heat required in the house is supplied by the gas passing through one gas-meter; and a coal-cellar in the place is really a superfluity. It and its accompaniment of dirt and dust (if stocked with coal) is not required in this house; the dust and dirt and all the labour are left for the Gas Company to deal with at the gas-works; and the householder is not required to have any dealings whatever with coal merchants and coal heavers. The Company are the householder's agents and servants in all these matters; and they relieve the householder of all the worry and trouble, by furnishing them, "on tap," with a cheap gaseous "fuel" in every room for incandescent burners and for heating purposes, at a low price.

While making inquiries into these matters, the eye notices, through the open door, that there is a lobby light in an ornamental lantern; and it is fitted with an inverted burner. Our guide round the house starts at this point, and shows how the gas to the lobby lamp is ignited and extinguished from within the hall by the use of a tumbler switch. There is also a hall light, with an upright burner, in an ornamental lantern; and in the angle wall at the rear of the hall, there is an oval-mouthed grate, fitted with gas and ball fuel. In passing, it is noticed that the house is so complete in its equipment that it is "on the telephone" for the convenience of customers. From the hall, introduction is made to the dining-room, which is well, but not extravagantly, furnished; yet very pretty. Over the table there is a four-light pendant, fitted with bijou inverted burners, and self-lighting

mantles. The lamps in their small red shades and beaded fringes look very effective. While mentioning the bijou inverted burners, it is of interest to notice that large use is made in this modern style dwelling of these low-consumption burners. For decorative effect in the modern house, they are not to be beaten; and we must say we like them as well on this account as for their high efficiency. On either side of the chimney breast, there are fixed bracket lights fitted with upright burners and bye-passes, and controlled by a pneumatic push near the door. The room contains a desk; and the desk carries a standard lamp with an incandescent burner and neat shade. In the fire-place is a gas-fire—properly fitted; and not merely stood in front of a discarded coal grate. All the rooms, in fact, are gas heated; and where a special fire is not fixed, the grate is supplied with ball fuel and gas.

From the dining-room, we pass to the drawing-room, which is decorated attractively, even artistically, without being lavish—that is to say, having regard to the class of property. The ladies describe it as charming. The central fitting is a three-light brass pendant, equipped with the well-known "Metrolite" burners, each burner being controlled by a separate switch near the door. Our guide quotes the price of this fitting; and, good looking as it is, and the nearest approach ever seen to an electric light fitting, the price complete is quite moderate. On either side of the chimney breast, there are incandescent gas "candle" brackets in gilt, fitted with lilliputian mantles of the upright kind. Central on the wall of the room opposite the fire-place, is a double-armed "candle" bracket of the same type and design. Coming under observation also is a floor standard lamp, fitted with an upright burner, and large shade; and our guide incidentally mentions that floor standard oil-lamps are now being converted by the Company for gas lighting. The South Metropolitan Company are great at conversion, as witness the 28,300 chandeliers transformed to fixed and safe appliances, free of charge, during the last twelve months. It may be thought that the lighting fixtures are overdone in this drawing-room. Each source of light, however, is of small capacity; and the Company, in the demonstration seek to show how effect, as well as utility, can be obtained in drawing-room lighting by gas. The room is fitted with a gas-fire, with light green enamelled casing, and Adam decoration in gilt. It is a handsome, yet not costly fire, and is fitted with Carpenter's patent tap. There is an upright brass tube at the side of the fire-place; and on the top of the tube the tap, which is supplied with a removable key, so that, when the gas has been turned off, it cannot by mischance (or by children) be turned on again. On the hearth of the fire-place is a movable kettle-stand, enamelled in art colour.

On the way to the domestic offices, it is noticed that the banister pier-post at the foot of the stairs is surmounted by a statuette holding two bijou inverted lights. This is an excellent ornament to the hall. In the passage leading to the scullery and kitchen, in a well-lighted cupboard, the meter is found on a shelf, so as to be available for speedy reading, and turning off by the consumer. Meters are not always favoured with such comfortable and convenient accommodation. A Stott governor is fixed to the outlet-pipe; and this reduces the pressure to 2½ inches. In the scullery, a "Metro" No. 2 cooker is found; this being of a type that can be hired at 2s. a quarter. The stove is fitted with hood and ventilating-pipe. Alongside is a "Scarborough" gas-heated copper, also provided with a ventilating-flue. An upright incandescent burner on swing bracket is fixed between the cooking-stove and copper—of course, at a height to give plenty of headroom for work below. In the kitchen is a combined gas and coal range—"The Queen," which also incorporates a water heating-arrangement. A water gas-heater is also introduced into the hot-water circulating system, so that this can be employed when the kitchener is not in use. Coffee-roaster, gas-heated airer, and so forth are also found in the kitchen. The lighting of the kitchen is by a central pendant, with large opal basin-shaped shade and eye-screen; the maximum amount of light by these means being thrown downwards without inconveniencing the eyes of the worker.

Going upstairs, a tumbler switch is fixed in a convenient place, so that a landing light can be set going before the landing is reached. In the prettily furnished bed-rooms, the fittings are in oxidized silver. The front bed-room has a bijou light over the bed, with small (beaded-fringed) silk shade; and this light is controlled by a tumbler switch handily placed at the side of the bed. On the walls, either side of the windows, there are brackets, also fitted with bijou lights and silk shades; and over the dressing table there is a two-light pendant. The room is fitted with a gas fire and a Carpenter's patent tap (as previously referred to), a separate trivet for a kettle, and a curling-iron stand. The adjoining dressing-room is lighted by an upright burner, and heated by a gas-fire. In the spare bed-room, the lighting is by two brackets (with upright burners) on either side of the dressing-table; and over the latter is a pendant carrying two bijou inverted burners. The gas-fire is fitted in the same manner as the one in the front bed-room.

In the corridor leading to the nursery, lavatory and bath-room accommodation is found. In the latter, Ewart's well-known No. 2 "Lightning" geyser, fitted (as it should be) with ventilating-pipe, is connected over the bath. This will produce hot water at the rate of 3 gallons a minute, or boil water at the rate of 3 quarts a minute. A 5 ft. 6 in. bath can, in the summer, be supplied with hot water by means of this heater in eight minutes, and in winter in eighteen minutes. The temperature of water flowing at these rates per minute is 40° Fahr. above that of the cold supply. Over the lavatory basin is placed one of Ewart's lavatory "Gem" geysers. With it, a small pilot-light is left burning; and when one of the hot-water taps is opened, the gas automatically lights up. The reverse is the case when turning off the hot water—that is to say, when a water-tap is turned off, the supply of gas to the burner is automatically discontinued. This geyser is fitted with a spray, or shower rose, and a tap for the supply of water for washing and shaving purposes. The lighting of the bath-room is by an upright incandescent burner. The walls of the nursery are pictorially papered, a cot stands in one corner of the room, toys are scattered about—even to the inevitable Teddy bear. The lighting of the room is by a single pendant incandescent light with opal dome shade and beaded decoration. The heating is by a gas-fire, controlled by the safety-stand tap already described. A boiling-ring is on top of the gas-fire. A gas-trivet is also fitted with the patent tap, so that young meddlesome fingers cannot interfere with the gas supply.

The novelty of this house (which is furnished well and in excellent taste) at No. 107, Bromley Road, attracts attention. Before leaving, we are asked to sign the visitors' book; and an inquiry as to how the enterprise is being rewarded was answered by a reference to the book, which was commenced on July 26, though the place was opened a few days earlier. An ordinary day's entries variously number from thirty to fifty; but as each signature, as a rule, represents a party, the visitors per day actually number, on an average, about three times more than the signatures. For instance, on Bank Holiday, there were at least 300 signatures; and the number of people who passed through the place on that one day was at least 1000. But with all this large number of people passing through the show house, and having the modern gas fittings and stoves explained to them, there was not the slightest damage done to the furniture or to the fittings. The best advertising for gas in these times is a demonstration with the normal conditions of a household as the setting. We have it in this model home, and congratulate the South Metropolitan Gas Company upon it, and upon the success, as expressed by popularity, of their enterprise.

VICTIMS OF ILLUMINANTS IN GERMANY.

Herr F. Schäfer, of the German Continental Gas Company of Dessau, has published in the "Journal für Gasbeleuchtung" his usual summary of statistics relating to personal injuries caused by accidents due to gas and other illuminants in Germany during the past year. The following tabular statement gives the figures for 1908, with the corresponding figures for 1907 within brackets; the line A being the number of accidents, the line B the number of persons injured, and the line C the number of deaths:—

	Coal Gas.	Electricity.	Petroleum.	Spirit.	Benzoline.	Acetylene.
A .	281 (197) ..	71 (57) ..	186 (225) ..	109 (115) ..	125 (82) ..	82 (25)
B .	341 (280) ..	66 (67) ..	196 (267) ..	122 (145) ..	158 (152) ..	19 (29)
C .	86 (40) ..	51 (48) ..	94 (130) ..	46 (67) ..	24 (18) ..	3 (6)

The total number of accidents attended by injury to the person has therefore increased from 701 to 790 in the course of a year; but the number of persons injured has fallen from 940 to 902. The number of deaths was approximately the same in 1908 as in 1907. Of the accidents due to coal gas, 192 were explosions, causing injury to 206 persons, of whom 5 died; while 89 were caused by gas escaping unconsumed and overcoming 135 persons, of whom 81 could not be resuscitated. The breaking or splitting of rubber tubing was responsible for 26 cases of asphyxiation, 17 of which ended fatally, and 3 explosions. There is only a small increase in the number of accidents reported as due to electricity, which is probably to be ascribed to the incompleteness of the reports made up to the present time. For instance, the report of the Industrial Insurance authorities for 1908 is not yet available; but it recorded for 1907 the deaths of 45 persons through electric current in Prussia alone. The great increase in the number of accidents due to benzoline or petroleum spirit is doubtless to be ascribed to the spread of motor traction. There is a falling off in the number of accidents due to acetylene. In addition to those recorded in the table, there were 8 cases of injury due to air gas, of which one terminated fatally, 2 slight accidents due to oil gas, 4 accidents with 2 deaths due to suction-producer gas, and 4 accidents with one death due to blast-furnace gas. Faulty or badly-managed heating appliances were responsible, through the evolution of carbonic oxide, for 54 accidents, involving 98 victims, of whom 69 could not be resuscitated.

Tar-Painting Macadam Roads.—In his annual report, the Birmingham City Engineer (Mr. H. E. Stilgoe) states that the "very beneficial" operation of tar-coating macadam roads was considerably extended during the summer of 1908. In the summer of 1906, three roads were treated by way of introducing the system; in 1907, the department tar-sprayed an area of 362,746 square yards, at a cost of £1398 8s. 4d., or 0·925d. per square yard; and last summer an area of 578,286 square yards (or a length of 44¼ miles) of macadam was covered at a cost of £2113 1s. 3d., or 0·876d. per square yard.

COAL CONVEYING AND STORING PLANT OF A GERMAN GAS-WORKS.

By a Berlin Correspondent.

The No. I. Gas-Works at Leipzig, till a short time ago, were coaled by manual labour. The coal-store, situated parallel to the retort-house, and separated from it by a number of tracks, forms a triangle, with a truncated apex. When Messrs. Unruh and Liebig, of Leipzig-Plagwitz, undertook to erect a mechanical coaling plant, they had to utilize this coal-store (fig. 1), consisting of nine individual sheds, 12 metres in width and 15 to 55 metres in length; arranging it for mechanical loading and discharging. Furthermore, the coal was to be automatically discharged, crushed, and conveyed to the retort-house, and delivered into elevated hoppers ready for the retort-charging machine. The plant was to be capable of dealing with 60 tons per hour.

In order to comply with these conditions, the central section of the coal-store was separated from the remainder, and rendered applicable to mechanical coaling by a suitable increase in height. In the track in front of the store were fitted a weighing-machine and a waggon-tilter (fig. 2), operated by an electric-motor through two intermediary gearings acting on two pumps. This arrangement, on the one hand, ensures rapid tilting, and, on the other, provides for a stand-by—a principle adopted throughout all the plant, so that one-half (30 tons capacity) always forms a reserve to the other half.

The coal tipped from the waggon falls into a funnel-shaped masonry pit, at the bottom of which are two feeders, supplying the coal to two bucket elevators which raise it to the third floor of the coal-station. As large coal, falling through a grating of about 40 centimetres mesh, had to be handled, both the feeders and elevators had to be given ample dimensions. The buckets were therefore made 800 millimetres wide, and 400 millimetres

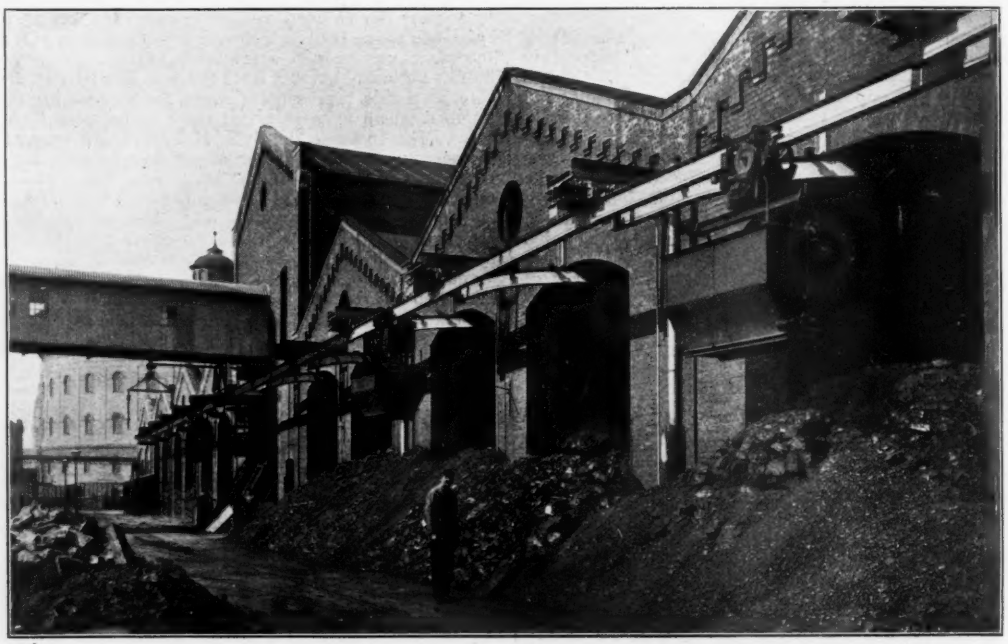


Fig. 1.—Coal-Store at the Leipzig Gas-Works.

high; and, running on rollers, they constitute a continuous row. The lifted coal is allowed to proceed in two different directions—either into the retort-house or to the stores. In the former case, it is taken from the elevator to two crushing-machines of the "jaw" type, with preliminary sieves, where the small coal is separated, and thence, by two elevators, on to two automatic weighing-machines. After having been accurately weighed there, the coal is taken over two feeders to two enclosed band-conveyors, traversing the space between the coal-store and the retort-house, to the latter. The band-conveyors enter the roof at about the middle of the retort-house (fig. 3).

The retort-house contains six elevated storage-hoppers having a total capacity of 360 tons. Over each hopper two conveyor bands run from the middle to both sides. In the centre is situated the distributing station, arranged so that either coal-store conveyor can be used to charge either retort-house conveyor—thus providing an ample reserve. Each of the bands has an automatic travelling dumping-car, going to and fro above the hoppers, and charging them at regular intervals. The hoppers have several rotary slides, allowing coal for the retort-charging machines to be withdrawn.

For the mechanical charging and discharging of the coal-stores, there is an electric overhead railway, surrounding the whole of the plant at a height corresponding to the height of the doors. This is in two sections, both of which traverse, in parallel, the central shed No. 5 (fig. 2), containing the despatching station. There they can be connected together by means of switches. From this outside railway, two rectilinear tracks run through each shed. Each of these tracks can be connected with the outside railway by two shunts; thus obtaining from the central despatching station communication through each shed. In order to load a shed, the shunts having been properly adjusted, the suspended railway-trucks are filled with 1·4 tons of coal from the buckets of the uncrushed coal-elevators, after which they are set in motion.

In each of the sheds are situated, besides the suspended railways, girders on which travels what is called the "buffer-truck." This can be manipulated through chains and a hand-wheel from the entrance to each shed, and comprises a buffer striking the lever which controls the bottom valves of the truck, thus disengaging these valves and dumping the coal while the truck is travelling. The suspended railway truck travels with opened valves as far as the despatching station, where it gets on a dead section, on which it is stopped. The operator then closes the valves, pushes the truck behind the bunker, and, after filling it, sets it travelling again towards the shed, by locking a switch. The sheds can thus be filled without any hand labour, apart from the arranging of the coal, which is poured out in a heap.

While the trucks used for filling the stores are provided only with travelling gear, those used for taking the coal from the stores have both travelling and lifting gear. They are, however, designed for holding only 1 ton of coal (fig. 4). The process is as

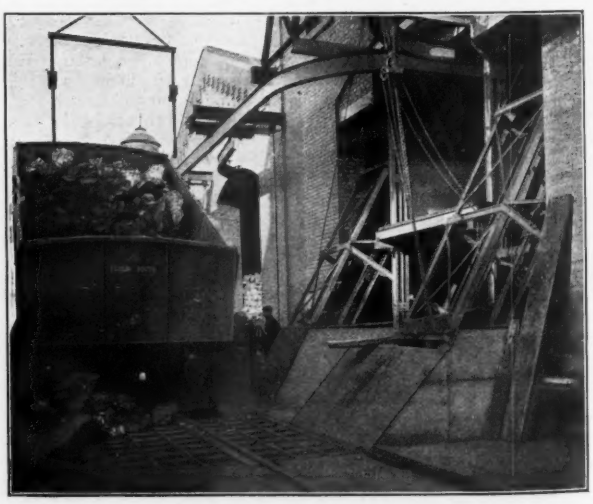


Fig. 2.—Waggon Tilter and Coal Elevator.

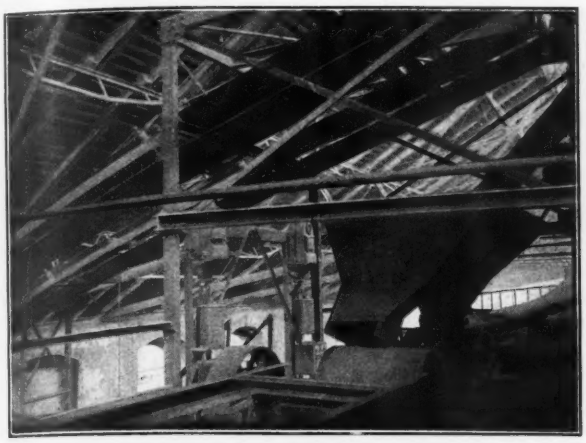


Fig. 3.—The Band Conveyor in the Retort-House Roof.

follows: The shoot above the crushers is first opened, so that the suspended railway truck, travelling above, may dump its coal (after the locking-lever has been lifted) into the shoot, and so into the crushers; and as this is effected in the course of travelling, no superintendence is required at this point. After a proper adjustment of the shunt, the empty cars proceed to one of the coal-sheds, where the buffer-truck has been stopped at the point where the vessels are to be filled. This buffer-truck comprises a rail which, by throwing the contact roller from the conductor, stops the truck. It is further provided with a traction rope of sufficient length, actuating the controller fitted to the buffer-truck. By operating this controller, the vessel is lowered down to the coal as long as the contact is actuated; this being interrupted at any height desired, in accordance with the height of the storage. When the vessel has been filled, the controller is again operated in the same manner, until the vessel, having reached its highest position, automatically brings into action the travelling motor. The filled truck travels as far as the despatching station, and, on its passing above the shoot, this is opened, and the coal is discharged through it on to the crushers, while the empty truck returns to the charging-shed. There is thus no manual operation required apart from the shovelling.

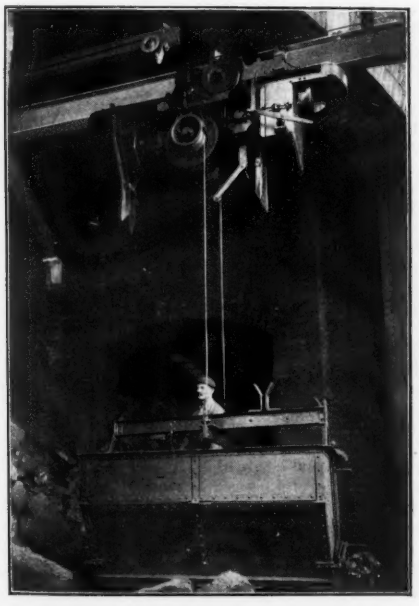


Fig. 4.—Charging the Suspended Railway-Trucks.

All the machinery is operated electrically, from a small central station arranged in the first section of the coal-store. Furthermore, the adjoining municipal electricity works, when required, would supply their current as a reserve. The following motors are employed: One for operating the tilting pump; two for the crushers and sieves; two for the elevators for large and crushed coal respectively, and the conveyors leading to the retort-house; and two for the four conveyors in the retort-house.

According to the provisional programme of the proceedings in the Engineering Section of the British Association at the Winnipeg meeting, which will open on the 25th inst., the Committee on Gaseous Explosions will present their second report, and Mr. Dugald Clerk, F.R.S., will submit a paper on the work of the Committee.

RAILWAY RATES AND THE GAS INDUSTRY.

By S. Whettall.

British Railways annually receive over £40,000,000 for carriage on goods carried by merchandize train. This amount excludes minerals and passenger fare receipts. When one considers what an enormous sum is spent on railway carriage, it is surprising to know from experience what little interest is apparently displayed by some traders in things pertaining to railway rates and affairs. Especially is this the case when it is realized that a certain amount of knowledge on the railway rate question will repay the merchant. Business people would be much surprised if they knew what great numbers of overcharges are made every year by the Railway Companies' servants in rendering carriage accounts to the public. Particularly is this so where certain goods are open to an incorrect interpretation of the classification of the articles being taken. Frequently, also, it is the case when machinery (mentioned hereafter) is forwarded, as, owing to the numerous different rates which are in existence for machinery, there are instances where a trader is charged on a much higher scale than is correct.

It must not be inferred that Railway Companies deliberately charge wrong and excessive rates; but the obvious and tangible fact remains that the public are overcharged to some considerable extent by having to pay more for carriage than they are legally bound to do. Two of the principal reasons why the public are made to pay more are: (1) Lack of knowledge of railway rates on their part; and (2) pressure of work preventing the railway clerk from taking sufficient care to avoid making mistakes. The rates and invoices are supposed to be checked by a responsible party. But in many towns this is only done in a very indifferent manner; and if the rate charged appears to be ample, little trouble is apparently taken to rectify many overcharges.

Railway Companies have a singular way of dealing with overcharges which are found out after the money has actually been paid. Supposing that a trader has paid his account, and has not deducted or noticed any overcharge. In the meantime, perhaps, the check clerks belonging to the Railway Company have found out that the trader has been charged too much. In this case, the surplus is retained by the Railway Company, and is registered in what is termed the "Overpaid Book." A moderate estimate of the total amounts which accumulate and are registered in these Overpaid Books, and still remain unclaimed, would be £1000 per week for all the railways in Great Britain.

The sources from which the surplus money emanates are so many and so varied that to quote a few instances will be sufficient for the purpose of this article. Suppose, for instance, a person went into a goods office to consign a quantity of gas-pipes. The clerk charges them under Class 3, rate 40s. per ton, and charges the trader for 10 cwt. at this rate, which amounts to 20s. This sum is paid by the sender probably at the time of consigning the goods. When the goods are being invoiced by the forwarding clerk, he may discover that the rate is in excess of the proper charge, owing to a special rate of 35s. being in operation for these goods. There is thus an overcharge of 2s. 6d. on the transaction; and this amount is registered in the Overpaid Book—the money going into the pockets of the Railway Company. Gas-pipes are generally charged under what is termed the Class C rate, unless a special rate in the Iron and Steel List happens to be in force. Very often there is a special rate in operation for gas-pipes, especially from certain centres of the iron trade; and the special rates are as a rule from 10 to 20 per cent. less than the ordinary class rate, although the reduction varies considerably. In any event, it will always pay the trader to ascertain whether there is a special rate in operation in the area over which he wishes to despatch goods, as a considerable saving is effected by watching this point.

As already remarked, a great many overcharges are made in connection with machinery traffic, owing to the numerous rates this traffic may be classified under. There is a mileage scale for various kinds of machines and engines, which is frequently overlooked; and as this scale provides for cheaper rates in most cases for gas and other horizontal engines, &c., it is advisable that the trader should see that this lower rate is used. Machinery in cases in parts is chargeable in Class 2 according to the Railway Classification Book; but in a great many instances it will be found that the trader has been charged at probably Class 3 rate, which is a higher one.

Frequent mistakes are made in what are termed as smalls—*i.e.*, items 3 cwt. or under, which come under the smalls scale. It may be said that the Railway Companies are empowered by law to charge from 5d. to 1s. 6d. more per package, according to weight, for goods under the smalls scale. When two small packages or more are despatched to the same consignee by the same sender on the same day, the trader should see that the separate weights are lumped together and not charged separately—*i.e.*,

	Cwt.	Qrs.	Lbs.	Ton.		s.	d.
Incorrect way—1 box of gas-fittings .	0	2	14	at 63s.	..	2	8
1 ,, ,, ,, .	0	3	0	,, ,,	..	3	0
						5	8
Correct way— 1 box of gas-fittings .	0	2	14	at 63s.			
1 ,, ,, ,, .	0	3	0	,, ,,			
	1	1	14	at 63s.	..	5	0

Overcharges are often made in this way by the railway, by charging separately.

A list of some of the goods used in the gas trade is appended, with the necessary explanation of the rates and the classes which the good are chargeable under.

	Class.	
Gas lime and other purifying refuse (excluding spent oxide of iron)	A.	
Gas or coal tar in owner's tank-waggons	A.	
,, ,, except otherwise provided for	B.	
Gas carbon (from retorts)	B.	
Gas-pipes, iron or steel	C.	I.
Gasholder sheets	C.	I.
Gas-pipes, iron or steel, in lots less than 2 tons	1.	Y.
Gas-engines, beds and cylinders	1.	
Gas-valves, iron or steel	1.	Y.
Gas-engines (when less, the mileage scale applies)	2.	
Gas-bracket blocks, wooden, packed in cases	2.	
Gas generators and holders, iron or steel, packed	2.	
,, ,, ,, ,, ,, unpacked	3.	
Gas-fittings in parts, except brass and copper tubing	3.	H.
Gas-making apparatus	3.	
Gas-meters (If not packed, only accepted at owner's risk)	3.	
Gas-stove fittings, not accompanying gas-stoves	3.	Y.
Gas or oil stoves (If not properly packed, only accepted at owner's risk)	3.	Y.
Gasaliers or chandeliers (If not properly packed, only accepted at owner's risk)	5.	

I signifies Iron and Steel List; and it often happens there are special rates for traffic in this list. H means Hardware List; and there are numerous special rates in operation for goods in this list. Y signifies that if an "Owner's Risk" note is signed, a reduction of 15 per cent. will be made from the rate.

For classification purposes, railway rates are divided into eight different sections or classes; and, in addition to these classes, are special rates for all classes—such special rates being allowed as a rule for large quantities, or possibly owing to the regularity of the traffic.

The names of the classes are as follows:—

Class A includes coal, slag, slack, gas lime, &c.
,, B ,, rough stone, bricks, gas carbon, &c.
,, C ,, various kinds of timber, gas-pipes, bolts and nuts, &c.
,, 2 ,, coal-cutting machines, petroleum oil, machinery in parts, packed in cases, gas-engines, &c.
,, 1 ,, coal-crushing machines, coal-washing machines, lubricating oils, gas-pipes in less lots than 2 tons.
,, 3 ,, various kinds of hardware, such as harness, weighing-machines, gas-fittings, &c.
,, 4 ,, wood patterns, steam-gauges, electrical instruments, &c.
,, 5 ,, glass carboys, gasaliers, chandeliers, and other fragile articles.

The classes vary in price—Class A lowest, Class 5 highest.

A.	B.	C.	1.	2.	3.	4.	5.
4s.	5s.	7s. 11d.	12s. 6d.	14s. 2d.	17s. 6d.	21s.	24s. 2d.

Maximum Terminals.

In respect of Merchandize Comprised in the undermentioned classes.	Station Terminal at each end. Per Ton. s. d.	Loading. Per Ton. s. d.	Service Unloading. Per Ton. s. d.	Terminals Covering. Per Ton. s. d.	Uncovering. Per Ton. s. d.
A	0 3	—	—	—	—
B	0 6	—	—	—	—
C	1 0	0 3	0 3	0 1	0 1
1	1 6	0 5	0 5	0 1½	0 1½
2	1 6	0 8	0 8	0 2	0 2
3	1 6	1 0	1 0	0 2	0 2
4	1 6	1 4	1 4	0 3	0 3
5	1 6	1 8	1 8	0 4	0 4

Classes 1, 2, 3, 4, and 5 include the charges for conveyance over the railway, use of Railway Companies' waggons and sheets, covering and uncovering, loading and unloading, and cartage at both the receiving and forwarding ends (unless specified to the contrary in the rate-book). Liverpool is one of the exceptional places where cartage is not included in classes 1, 2, 3, 4, and 5. But such exceptions are rare. Class C rates include all the services with the exception of cartage; and this the trader has either to provide himself, or else pay for in addition to the rate. The only services that Class A includes are the charges for conveyance, and for the station terminals—*i.e.*, the use of the station, &c. The trader as a rule provides the waggons for this class of traffic. If not, a charge for waggon-hire is made when the Railway Companies' waggons are used. This charge varies from 4½d. to 1s. 3d. per ton, according to the distance the waggon travels. Class B rate includes the rate for conveyance, the charge for the station terminals, and the hire of waggons. Class C rate includes the station terminals, hire of waggons, charge for conveyance, unloading, loading, covering, and uncovering. Class 1 to 5 rates include station terminals, hire of waggons, charge for conveyance, loading, unloading, covering, uncovering, and also the charge for cartage at both ends, unless otherwise specified in the Railway Companies' rate-book.

In cases where the trader performs any of the services which are stated as being included in the rate, he is entitled to a rebate. The following is a list of the services which he may perform, if he gives proper notice to the Railway Company:—

Providing waggons for traffic in Classes B and C and 1 to 5.
Performing the service of loading and unloading in Classes C and 1 to 5.
Performing or doing without the service of cartage on traffic in Classes 1 to 5.
Using private sheets or doing without sheets for traffic in Classes C and 1 to 5.

In any of these cases, the trader could claim allowances, the maximum scale of which is given below. It must be distinctly understood that with respect to some of the sidings, private and otherwise, special agreements are in force between the traders and the Railway Companies; and in all such instances the terms of the agreement will bind both parties.

Should the trader look after the rebates mentioned in the foregoing matter, he will effect some considerable saving; and, in addition to these rebates, it is policy to see that wherever a special rate is in operation for any class of traffic, this rate is charged, and not the ordinary class rates, as the special rate is generally lower than the ordinary one.

USING STEAM-TURBINES ON GAS-WORKS.

The "Journal für Gasbeleuchtung" of the 31st ult. contained two articles on different applications of the steam-turbine in gas-works. The first, by Herr Pfudel, of Charlottenburg, deals with the use of turbine blowers as gas-exhausters; the second, by Herr Pohmer, the Manager of the Mariendorf Works of the Imperial Continental Gas Association, deals with the use of the turbine blower for long distance high-pressure gas supplies. Both papers were presented at this year's meeting of the Brandenburg Association of Gas, Electricity, and Water Engineers.

Herr Pfudel states that the steam-turbine has already been extensively adopted at the No. 2 Gas-Works at Charlottenburg. For working the extensive coal-conveying plant and the coke-handling plant, there are two turbine dynamos, each of 100 kilowatts, for driving the electric-motors. The blast for the boiler-furnaces in the new boiler-house and the compressor of the water-gas plant are also worked by steam-turbines. There were already established in the No. 2 condenser-house two vertical reciprocating exhausters for pumping the gas, each of a capacity of 175,000 cubic feet per hour, and room was provided for a third. These exhausters, however, take up a great deal of space; and it was feared that when a third was erected there would not be space for proper supervision of, and attendance on, the rest of the apparatus in the room. It was therefore decided to put in, instead of the third reciprocating exhauster, a steam-turbine coupled with a compressor. The compressor is on the Rateau system, and is driven by a Laval steam-turbine erected on the same bed-plate.

The arrangement is shown in fig. 1. The compressor, working at 4000 revolutions, pumps 175,000 cubic feet of gas to a pressure of 31·6 inches of water. The turbine itself is then making 20,000 revolutions. The Rateau compressor is on the fan principle, and works in two stages. The fan wheels are of wrought steel, and the blades of steel plate. The special feature of the compressor, however, consists in three cast-iron rotating pieces, which are divided in the horizontal middle plane so that, by removing the upper portion, access is readily obtained to the shaft and the other moving parts. Owing to variations in the make of gas, the governing at first presented some difficulty. It is accomplished by means of regulating nozzles which are now controlled in somewhat similar fashion to the Hahns governor on rotatory exhausters. Experience has shown that the great number of revolutions of the fans effects a very large separation of tar; so that the work of the tar-separators which follow the exhauster is greatly relieved. The chief advantage of the arrangement is its small initial cost. The whole apparatus costs between £600 and £650, and weighs about 4½ tons. There is, further, considerable economy of space, and the foundations are cheaper, as they are not subject to thrust or shocks. No bye-pass is necessary, as when the turbines are at rest the gas can pass in the ordinary way through the fans.

In regard to steam consumption, the steam-turbine, although intended to be run up to 25 H.P., has hitherto only been run up to 15 H.P. It is provided with a Körting jet apparatus; and experiments have shown that the consumption amounts to 33 lbs. of steam per horse-power-hour. The steam consumption has been measured by a steam-meter from an Elberfeld firm, which depends on the passage of the steam through a pipe and up through a valve-like casing in the conical part of which is a valve plate, the position of which is recorded on a diagram, and is determined by the amount of steam which passes round its edge.

Herr Pohmer said that the high-pressure main from the Mariendorf works to the south-west suburbs of Berlin had an initial pressure of about 40 inches of water. Formerly the gas was forced into the main solely by a Roots blowers driven direct by a steam-engine coupled to the axis of the blower. These blowers, which were the largest size made, had a capacity of nearly 440,000 cubic feet per hour apiece. It was soon found, however, that the Roots blowers, which, in the smaller sizes in which they had been used elsewhere had answered well, had not been perfectly satisfactory in this large size. Their chief fault had been that if the room could not be maintained in cold weather at the normal temperature, the blades of the blower rubbed against the walls of the casing owing to the unequal expansion of the fan and casing. Heating of the blower then ensued; and it had to be put out of action. This difficulty could doubtless be overcome; but as the capacity of one blower was too small for the contemplated extension of the plant, and it did not appear advisable to construct larger Roots blowers, it was decided to adopt some other system

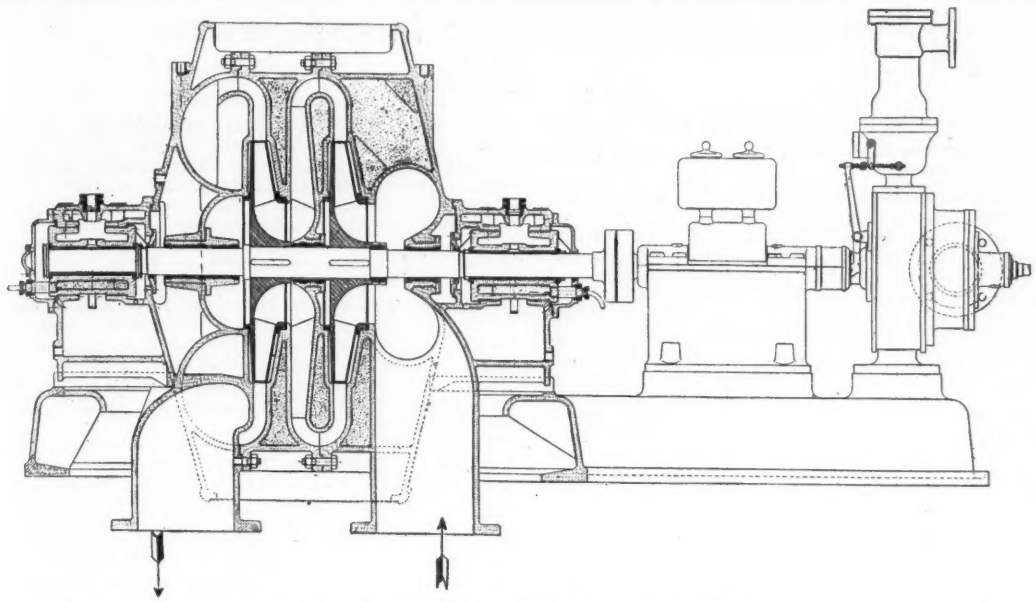
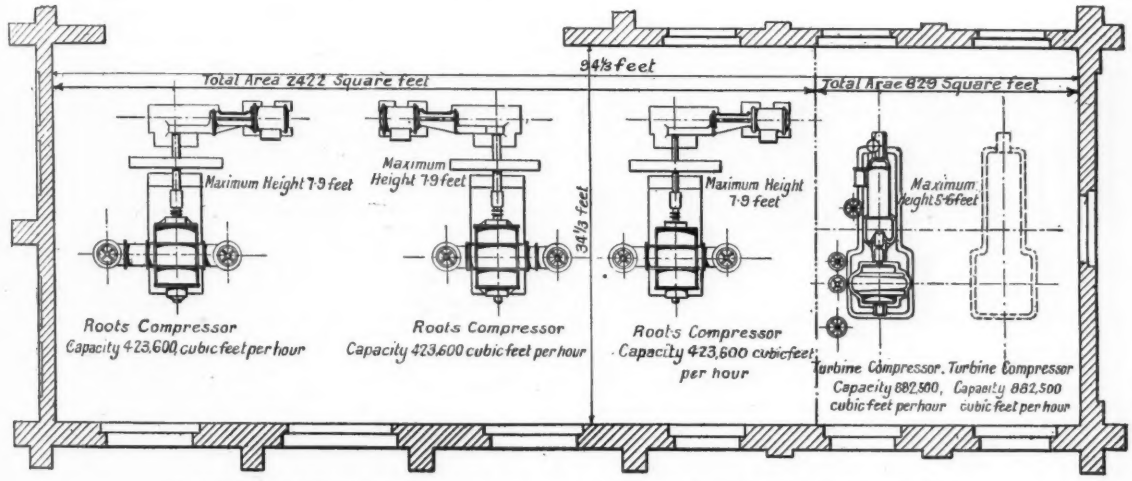


Fig. 1.—Laval Steam Turbine, with Rateau Compressor.


94⅓ feet
Total Area 2422 Square feet
Total Area 829 Square feet
Maximum Height 7·9 feet
Maximum Height 7·9 feet
Maximum Height 7·9 feet
Maximum Height 5·6 feet
34⅓ feet
Roots Compressor Capacity 423,600 cubic feet per hour
Roots Compressor Capacity 423,600 cubic feet per hour
Roots Compressor Capacity 423,600 cubic feet per hour
Turbine Compressor. Capacity 882,500 cubic feet per hour
Turbine Compressor Capacity 882,500 cubic feet per hour

Capacity of Roots Compressors . . . . . 3 × 423,600 = 1,270,800 cubic feet per hour.
,, ,, Turbine Compressors . . . . . 2 × 882,500 = 1,765,000 ,, ,, ,,

Fig. 2.—High Pressure Plant at the Mariendorf (Berlin) Gas-Works.

entirely. The alternatives were either a reciprocating or piston compressor or centrifugal blowers working in successive stages. There were in the room in which the plant was to be erected gas apparatus with water seals, and this rendered the introduction of gas-engines or electro-motors out of the question.

The application of turbine blowers to blast-furnaces, in regard to which the firm of Brown, Boveri, and Co., of Baden, in Switzerland, had taken a prominent position, led to their being approached as to the practicability of applying steam-turbines to the driving of blowers. Last year this firm was commissioned to supply a Parsons turbine of 156-H.P. coupled directly to a Rateau blower working in two stages, subject to the condition that the blower should pump 875,000 cubic feet of gas per hour against a pressure of 48 inches of water. The steam consumption with condensing was not to exceed 22 lbs. per horse-power-hour. It was further stipulated that the pressure was never to vary by more than 5 per cent., even with fluctuations in the draught on the main of as much as 50 per cent. When tested, the installation showed a capacity of 1,050,000 cubic feet per hour at 3200 revolutions. All the other conditions were fulfilled, though for the time being an automatic governor has not been put in. When this has been done, no doubt the stipulated degree of uniformity of pressure will be maintained automatically. The arrangement of the plant alongside the previously erected Roots blowers is shown in fig. 2. The manner in which the stuffing-boxes of the blower are made tight is interesting. With the large number of revolutions at which the turbines work, an elastic packing could not be used. The joint is made tight by turning a groove in the bearing all round the shaft and keeping this groove filled with water and under hydraulic pressure. The water consumed for this absolutely tight joint is quite small.

The turbine blower has been in use every day since November last, and has given every satisfaction. The steam consumption of 22 lbs. per horse-power-hour must be considered good for such a small engine; and the oil consumption is practically *nil*, as the oil-tank after four months working has not yet been replenished. One advantage of the plant over other gas pumping plant is that the gas-valves need not be opened till the blower has been started and attained full speed. It is thus possible for one man to attend to the whole plant; whereas the old plant always wanted two or three men. The space required for the plant is also smaller, as two turbine blowers, having a joint capacity of 2,100,000 cubic feet per hour, can be erected on the site of one Roots blower of 420,000 cubic feet capacity. Exact figures as to cost cannot yet be given; but it may be said that the plant is considerably cheaper than the former one per unit of capacity.

In the discussion which ensued on the reading of these two papers, Herr Schöneberg, of the Tegel Gas-Works, Berlin, asked Herr Pfudel to say just how the tar which was separated in the blower was taken off, and whether it did not entail frequent cleaning of the apparatus. It was stated in reply that the tar was flung through screens and then ran into an ordinary syphon-pot, from which it passed into the tar-well. Once in every three or four weeks the blower was cleaned on a Sunday. The blower was situated about 400 feet away from the retort-house, and took the place of an ordinary exhauster. The gas had previously passed through an atmospheric condenser and a Reutter tubular condenser. From the blower it flowed into a tar-separator, and thence into the washers.

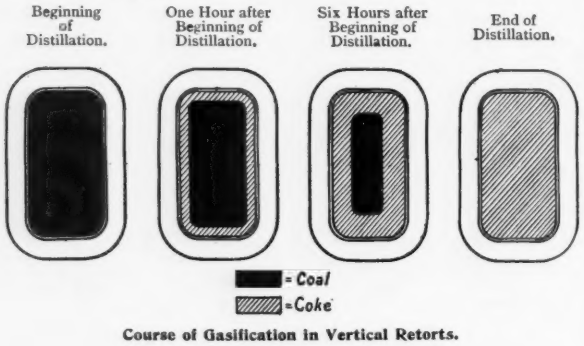
We have received from the Kramers and Aarts Water-Gas Company, Limited, a booklet containing illustrated descriptions of various installations of their plant in large and small gas-works. They are preceded by some explanatory particulars of the system, the points of particular interest in connection with which are fully set out. As our readers are aware, the Company have a very large installation of their plant at Amsterdam, its daily capacity being rather more than 2 million cubic feet; and fine views are given of it in course of erection.

THE PROCEDURE OF GASIFICATION IN VERTICAL RETORTS.

By Dr. J. Bueb, of Dessau.

The following is a slightly condensed translation of a communication on this subject by Dr. J. Bueb, the inventor of the Dessau type of vertical retort.

The author, in an earlier communication,* expressed the view that the greater part of the gas produced in vertical retorts ascended through the cool middle part of the retort. This view has been contested in various quarters; and in a number of communications the opposite view has been maintained—viz., that in vertical retorts the gas produced does not ascend through the middle, but between the wall of the retort and the coke. If this latter view were correct, the gas made in any conditions would have to traverse a highly-heated layer of incandescent coke before leaving the retort, as will appear from the following consideration. The gasification of the coal, and the consequent formation of coke, begin immediately fresh coal is charged into the highly-heated retort, and progress from the wall of the retort inwards. After a short time, a thin layer of coke is formed near the retort wall, and after the lapse of an hour it will have attained a thickness of from 2 to 3½ inches, and be at a red heat. This layer of incandescent coke has by this time become the conducting medium by which the heat of the retort is transmitted to the inner layers of coal, which become smaller as the layer of coke grows. When the layer of coke has advanced inwards from all sides to the middle line of the retort, distillation is finished. The illustration shows the progressive stages of distillation.



Course of Gasification in Vertical Retorts.

If, therefore, the gas produced ascended not through the still unchanged layer of coal in the interior of the retort, but by the walls of the retort, the whole of the gas almost from the time of charging would have to traverse an incandescent layer of coke. It is well known that coal gas, when heated to a temperature of 800° to 900° C. (say, 1470° to 1650° Fahr.), is altered in chemical composition by the decomposition of the heavy illuminating hydrocarbons into carbon, hydrogen, naphthalene, and other hydrocarbons. Nevertheless, the author deemed it important to obtain experimental proof that coal gas cannot traverse even small layers of incandescent coke without suffering profound decomposition. At his suggestion, some instructive experiments were undertaken with this object in view in the laboratory of the German Continental Gas Company. The conditions obtaining in a vertical retort an hour after charging were reproduced artificially in the following way: A piece of coke, about 2½ inches in length, was put into a porcelain tube, 1·1 inch in diameter, so as to be a good fit; and the crevices between it and the walls of the tube were rammed full with coke dust. Coal gas was then passed through this piece of coke when it had been raised to various temperatures. The loss of pressure resulting was measured; while the composition of the gas was ascertained by analysis. The results are shown in the following table:—

Temperature in the Tube.	Loss of Pressure. Tenths of an Inch.	Composition of the Gas. Volumes Per Cent. Carbon Dioxide.	Heavy Hydrocarbons.	Oxygen.	Carbon Monoxide.	Methane.	Hydrogen.	Nitrogen.	Quality.
Cold	3·1	0·5	3·1	0·1	5·3	33·8	52·6	4·6	627 B.Th.U. per cub. ft.
500° C.	8·7	0·8	2·5	0·2	5·4	32·1	54·1	4·9	
700° C.	11·0	1·0	2·8	0·2	5·3	29·6	56·6	4·5	
800° C.	11·8	0·8	1·4	0·1	5·4	26·5	58·8	7·0	Illuminating power greatly reduced.
900° C.	12·6	0·8	0·4	0·0	5·3	23·45	63·6	6·45	497 B.Th.U. per cubic ft. Illuminating power nil.

* See "Journal," Vol. XCI., p. 807.

It is apparent from this tabular statement that coal gas is so changed in composition by passing through even a relatively thin layer of incandescent coke that it is completely deprived of illuminating power, while the heavy hydrocarbons are almost wholly decomposed. In addition to this decomposition of the heavy hydrocarbons, there is at the same time partial destruction of the methane. The volume of gas thereby undergoes considerable increase. The coke, which had previously been porous and silvery white, at the end of the experiment had its surface blackened with soot, and its surface-pores closed with fine deposited carbon. It was interesting to observe that the deposition of carbon extended only a few millimetres into the interior of the piece of coke, and the blackening only went deeper in where there were fissures in the coke. It may hence be concluded that a properly incandescent layer of coke will decompose coal gas though it is only a few millimetres deep.

The rapid and heavy increase in the loss of pressure which the gas suffers on passing the incandescent lump of coke, must be ascribed to the separation of carbon closing the pores. Further, not only does the illuminating power of the gas disappear on passing through the incandescent layer of coke, but the calorific power also falls off very considerably—viz., by 20·8 per cent.—owing to the destruction of the heavy hydrocarbons and the partial suppression of the methane. After it had traversed the incandescent block of coke, the gas was passed through a condensing worm, artificially cooled to about 35°-36° Fahr. There was a heavy deposition of crystals of naphthalene on the walls of the glass condensing tube. Experimental proof was thus afforded of the heavy formation of naphthalene by the passing of coal gas through incandescent coke.

Some further experiments were made with the object of studying the action of steam in the presence of coal gas on the incandescent coke blackened with soot. After a piece of coke had been thus coated with soot by passing coal gas through it in a porcelain tube at about 900° C., as already described, coal gas supersaturated with steam was passed through the coke for 1½ hours at a temperature of about 900° C. Considerable formation of water gas took place in addition to the decomposition of the coal gas. The quantity of gas increased from an initial volume of 159 litres to 238 litres, or by about 50 per cent. The resultant gas had the following composition:—

Carbon dioxide	1·4	volumes	per cent.
Heavy hydrocarbons	0·2	,,	,,
Oxygen	0·0	,,	,,
Carbon monoxide	23·6	,,	,,
Methane	13·8	,,	,,
Hydrogen	58·0	,,	,,
Nitrogen	3·0	,,	,,

The most interesting result of the experiment was the fact disclosed that the carbon previously deposited in the form of soot by the decomposition of the hydrocarbons was only partially consumed by the steam in the formation of water gas; whereas the coke itself was at the same time drawn upon for water-gas production. It may hence be concluded that the molecular carbon separated through decomposition of the hydrocarbons, despite its state of fine division, is not in any way more ready to react than the carbon which is present in the form of coke.

The experiments recorded are capable of being extended in various directions, and are not yet to be regarded as exhaustive. Perhaps they may prompt a continuation and extension of such investigations by other and more scientific bodies—such as the experimental works of the German Association of Gas and Water Engineers.

The results of these experiments, however, establish the fact that by passage through even a very thin layer of incandescent coke coal gas completely loses its character as an illuminating gas, owing to the decomposition of its heavy illuminating hydrocarbons; while per unit volume it suffers a heavy fall in calorific power. If the view were correct that in vertical retorts the gas passes up between the wall of the retort and the block of coke, it is obvious, having regard to the high heats at which these retorts are worked, and to the speedy formation of a layer—thin indeed at first—of incandescent coke between the wall and the uncarbonized coal, that the gas would be subjected to the radical decomposition which has been shown to ensue when coal gas passes through such a layer of coke. Hence if the coal gas before it escaped from the retort really traversed this layer of incandescent coke alongside the wall of the retort, it is clear that the vertical retorts would not yield any illuminating gas at all. But practical work has proved that the gas produced in vertical retorts has a higher illuminating power, and represents a higher yield per ton of coal carbonized of heavy hydrocarbons, than the gas obtained in ordinary horizontal or inclined retorts. Further the experiments indicate, by analogy, that there should be a continuous rise of pressure, from the beginning of distillation onwards, in the lower part of the retort. As a fact, the reverse is found to be the case.

The procedure of gasification in the vertical retort is, in the author's view, as follows: After the charge of coal is introduced into the highly-heated retort, there follows at first—particularly in the lowest and hottest portion of the retort—a sudden and great

evolution of gas. The coal directly in contact with the wall of the retort evolves coal gas rapidly and freely. In this first stage of all in the distillation there is not present any layer of incandescent coke, and the gas impinges at once on the highly-heated wall of the retort and is there decomposed for the most part. Carbon is deposited from it, and, owing to the great heat to which it is exposed, separates in the form of graphite. This state of things, however, passes very rapidly, and after quite a short time a thin layer of coke is produced by the great heat of the wall of the retort. This layer constitutes a protecting coating between the hot wall and the gas rich in hydrocarbons which is being produced in the interior of the retort. After the formation of this coating, the gas produced strikes against the incandescent layer of coke, and, by deposition of soot, makes it impermeable to gas; so that the rest of the gas made must, for the most part, ascend through the interior cold core of coal, and be thereby protected from further decomposition. It may be that, at a later stage in the distillation, the specifically much lighter gas, poor in hydrocarbons, which is then produced, has passed through a core of incandescent coke and ascended between the retort wall and the coke. This might specially be the case when the steam produced in the distillation of the coal had, by the consumption of carbon, opened up ways and passages through the coke. But this remains to be proved. In any case, the author considers it established that the coal gas proper, with its heavy hydrocarbons and high proportion of methane, escapes by another way—viz., through the interior cold part of the retort.

The part which steam has been shown by the experiment already reported to play in the procedure of gasification, affords an explanation of the large make of gas in the vertical retort. The steam which is continuously produced in the distillation of coal will always find ready to hand—especially during the second half of the period of carbonization—incandescent coke with which it will partially interact and form water gas. This involuntary formation of water gas, however, naturally increases the make of gas per ton of coal. These considerations also afford a natural explanation of the increase in the number of calories obtained in the total yield of gas.

The view that the gas ascends between the coke and the wall of the retort has doubtless been derived from observation when the upper lid of the retort is opened at the close of carbonization. The coke, especially at the top, generally has come away from the retort wall—more or less, according to the description of coal carbonized. Small flames dance out of the intervening space, and hence the erroneous impression may readily be formed that the gas during distillation has also taken the same course. This impression, however, does not accord with the procedure of distillation as described above. Conditions of draught and pressure are quite different when the lid is open from when it is shut.

All the phenomena of vertical retort working, as distinct from those of horizontal retort working, are explicable in a perfectly natural way by means of the procedure of carbonization which has been formulated in the foregoing. These phenomena are: (1) Greater yield of calorific and illuminating value in the gas per ton of coal carbonized. (2) Increased make of gas. (3) Absence of thick tar. (4) Great decline in the amount of naphthalene in the gas and tar. (5) Increased yield of ammonia. (6) Decreased yield of cyanogen.

The chief argument of those who oppose the author's view is that much scurf is produced, especially in the lowest and hottest part of the vertical retort. This formation, however, is naturally explained by the above considerations, according to which the production of graphite or scurf is only to be regarded as an initiatory occurrence at the commencement of distillation.

The Cheapest Gas in Germany.

It is announced that in June last the Municipality of Königsberg, the capital of East Prussia, decided to grant a rebate of 20 per cent. on the amount payable for gas consumed for heating rooms, provided the supply was taken through a special meter. As the price of gas for heating and cooking purposes in the ordinary way was already only 12 pfennige per cubic metre (3s. 4¾d. per 1000 cubic feet), this rebate brings the price of gas for heating down to about 2s. 8½d. per 1000 cubic feet, which is, we believe, the lowest price now obtaining for town gas anywhere in Germany. The rebate may be secured also during the winter months on all gas consumed in excess of 5250 cubic feet per month through a meter supplying gas for both heating and cooking purposes. The announcement is interesting, as affording proof of the success of the efforts of Herr Kobbert, the Manager of the Königsberg Gas-Works, to make gas at the lowest possible cost. His views on the manufacture and use of water gas, and on the proper calorific power of a town gas supply, have frequently been reported in the "JOURNAL." His achievements in cheapening production, and in popularizing the use of gas for heating, are doubtless responsible for the tentative selection of Königsberg for next year's meeting of the German Association of Gas and Water Engineers.

Dr. George Frederick Deacon, formerly Borough Engineer and Water Engineer of Liverpool, and President of the Association of Municipal and Sanitary Engineers, who died on June 17, aged 65, intestate, left estate valued at £28,762 gross, with net personalty £26,684.

IRISH ASSOCIATION OF GAS MANAGERS.

ANNUAL GENERAL MEETING IN DUBLIN,

AUG. 10, 1909.

PRESIDENTIAL ADDRESS

of Mr. F. T. EUSTACE, of Tullamore.

Gentlemen,—My first duty is to thank you most sincerely for the great honour you have conferred upon me in electing me as your President for the past year. It is an honour I esteem most highly, especially as there are undoubtedly several men in our Association much better qualified to fill the important position. My duties for the past year have been very light; but I feel that I am hardly able to meet the duty imposed upon me at this meeting—namely, that of delivering an address which will commend itself to you and bear any sort of reasonable comparison with the able addresses that have been delivered to this important body by Presidents who have gone before me. I rely, however, upon your kind consideration; and I have no doubt you will, in your usual good spirit, overlook any of my shortcomings.

Another year has quickly run its course since we met together in our Association to discuss those important questions which interest us; and at its conclusion, reviewing it, I think we may congratulate ourselves that the gas industry has maintained its normal rate of progress, and commands the support of the public to-day more than ever before.

The gas-works which I control are comparatively small. When I look around the room and see the faces of gentlemen from whom I have often received valuable instruction, my mind naturally reverts to the immense interests which are committed to their care; and it is then that I appreciate the brotherhood that exists between us, which has resulted in placing me in this distinguished position to-day. I do not fear that any considerable assault can be made on the impregnable position of the gas industry, when its fortress is defended by the men whom I see around me. Electricity and other forms of light, which are going to cost nothing, as we read frequently in the Public Press, are to come as free gifts from the gods, who haunt the daily steps, and even disturb the sleep of gas managers. But I am convinced they are only phantoms of ghosts that really have no power except, perhaps, to quicken our zeal to make our light more beautiful and more revealing still.

I wish now, particularly, to-day to refer to one of many agencies with which our profession is connected which contribute to the general strength of our position—that is, to the manufacture of sulphate of ammonia, which is one of the greatest fertilizers known. So that while our main business is to dispel the darkness of the night so also are we assisting to dispel the gloom that hangs over the agricultural industry of this country.

It is my intention to read a paper embodying my experiences in connection with the working of a sulphate plant where I have the honour to be employed; and I will not elaborate upon the different matters pertaining to the gas industry, or the general principle underlying its successful working. Before claiming your attention to the paper I shall have the pleasure of reading presently, I should like to take the opportunity of saying how much importance I attach to gas managers identifying themselves with one or more of the several Associations in existence, and helping on these bodies by attending personally at their meetings whenever possible. We are living in an age of keen competition in every sphere; and the tendency among every class is to combine. I may safely say, without the slightest fear of contradiction, that there is no industry where combination is more necessary than in the gas industry. With the various other new illuminants that are constantly coming on the market, it is important that we should combine to hold our own, and show others that we are doing so.

THE POSITION OF GAS MANAGERS.

Independently of this altogether, gas managers must educate themselves in the various technical matters relating to their profession. Whatever view may have been held in the immediate past as to the qualifications for the successful gas manager, the future holds out no hope for the success of an easy-going policy; and I do most certainly consider that these meetings of technical men are an invaluable factor in the continuous process of our education. Personal mental attention enables us to discard much that is of no real service, and to replace it with new lines of thought which generally open out hitherto unexpected fields of endeavour.

It is a matter of personal everyday knowledge that a keen personal discussion results in modifying our views of the matter in question, and, consequently, our actions. I therefore consider that the mere reading of "Transactions" as published in our Technical Press, does not by any means satisfy the true requirements either of our own education or the advancement of the industry with which we are connected. It may appear, perhaps, at first sight a far-cry for some of our gas managers in charge of small country works—and there are many such, especially on this side of the Channel—to concern themselves with the latest developments in (say) carbonization in bulk, calorific tests, high-pressure distribution, filament lamps, and so on; but a moment's

reflection will, I think, bring home the fact that no acquired knowledge is wasted. Stagnation, especially in these days, is a useless policy; and a well-considered line of progress, suited to the conditions of the case, is an all-round asset to all concerned. There never was a period, like the present, when there was so great a demand for better methods and a cheaper article, and such intense competition.

I have heard that both petrol and acetylene gas plants find ready markets in this country, not only for use in places where gas is not (which is their legitimate sphere), but in places where gas is already installed—the cost of coal gas being such as to offer an opening to the rival illuminant. Therefore, every advance made in new methods of carbonization and distribution (both low-pressure and high-pressure apparatus) for utilizing our product to the best advantage, and last, but by no means least, the commercial methods by which our business is conducted, are matters of real and vital interest to us all, no matter how small our works may be. It must not be forgotten that a small gas-works often offers an excellent opportunity for testing a new idea; whereas there is perhaps not time in the rush of a busy works, or may be, space is lacking to give it the attention which its merits warrant. It is therefore with both these views in mind, which I have attempted to touch upon, that I lay before the Association a short paper on one point of what might be done in a small works.

INSTALLATION AND WORKING OF A SULPHATE PLANT.

It is with some diffidence that I venture to lay before you to-day a few particulars relating to the installation and working of a sulphate of ammonia plant. I say with diffidence, inasmuch as one is so accustomed to reading and hearing of the details of large sulphate plants, so especially common in the larger works of our fellow managers on the other side of the Channel, that the plant which I purpose dealing with may, by comparison, appear insignificant.

My reason, however, for dealing with such a subject is, that the question had been often raised whether it is commercially practicable to instal such an apparatus in a small works—say, about the capacity of 10 million cubic feet per year; and in order that the subject may perhaps be somewhat clearer to those considering the *pros* and *cons*, I have thought that the experience I have had of the working of a sulphate plant on a small scale might be of interest, if not of value.

The works I have the pleasure to preside over makes 7½ million cubic feet per year, and uses at present Scotch Twechar coal; the average make per day per mouthpiece being about 5000 cubic feet. There is no special apparatus for separating the liquor and tar beyond the usual arrangements of baffles in the tar-tank. The liquor is stored underground; the capacity of storage being 4500 gallons. The washing plant consists of a Cockey washer only, 10 ft. by 1 ft. 6 in. by 3 ft. 6 in.; and the liquor is worked up to 5° Twaddel, or 10-oz. strength. Previous to the introduction of the sulphate plant, the ammoniacal liquor had to be carted out to the country, at heavy expense, for disposal; and as the difficulties of this method increased, some alternative had to be found. After much consideration, it was decided to instal a sulphate plant, though it was a matter of some doubt at the time whether it would prove a commercial success, apart from a means of relief from the liquor nuisance.

The capacity of the sulphate plant is 10 cwt. per day. It consists of two stills, 14 ft. by 22 ft. and 6 ft. by 2 ft.—one for the "free" ammonia and the other for the so-called "fixed"—and a solid-plate saturator 1-inch thick, 3 ft. by 2 ft. 9 in. by 2 ft. 3 in., which is fitted with a 2-inch "G. B." exit for ammonia and a 3-inch cast-iron pipe for the waste gases. The superheater is 8 ft. 6 in. by 1 ft. 6 in., and contains three iron pipes. The acid tank is made of timber lined with sheet lead. It holds 10 gallons of acid, and is fixed about 8 feet from the saturator. There is a 1-inch pipe from this tank, with an earthenware cock attached, which conveys acid from the tank to the saturator. The liming apparatus consists of a round metal tank, 3 ft. 6 in. by 2 ft. 6 in. deep. It is fixed close to the free still and connected to the fixed still by means of a steam-injector.

When working, the lime (which is made locally) is placed in a loose texture bag, and well worked about in the water of the tank until a good mixture of smooth cream of lime is obtained. The liquor, meantime, has been pumped to an overhead tank, so as to obtain a constant steady flow through the apparatus, and steam is admitted to the still at 6 lbs. pressure per square inch, as shown by the gauge. The stills consist of a number of trays and hoods with serrated edges; and the steam bubbling through the edges of the hoods from tray to tray thoroughly agitates the incoming liquor, and by its heat liberates all the "free" ammonia. The partially distilled liquor then passes to the second or "fixed" still, where it meets with the cream of lime solution, which is forced in with the aid of a steam-injector. The bubbling and agitation are repeated; so that every particle of lime is brought into intimate contact with the fixed salts of ammonia, when the lime, being a stronger base than the ammonia, drives the latter forward to the saturator. The spent liquor and lime then pass away to the sewers. No trouble is experienced thereby, as our make is so small; otherwise, of course, we should have to instal the usual precipitating tanks, and run the effluent only to the drains.

The liberated ammonia, as well as other gases, such as sulphuretted hydrogen, &c., travel forward to the saturator, where they meet a solution of sulphuric acid, which combines readily with the ammonia to form the well-known sulphate; leaving the other gases, and also some steam, to pass away through the superheater, wherein they part with their waste heat to the cold liquor on its way to the still for treatment.

The acid is raised from the store into the saturator by a steam injector, and the solution is made up to about 60° Twaddel at the start of operations, and allowed to run down to about 56° Twaddel, when it is ready for fishing. The crystals of sulphate are allowed to well drain, and are then removed to the store, which is 8 ft. by 7 ft. 6 in. by 3 ft. 6 in., lead covered.

The waste gases from the saturator pass through the condensers, which are composed of a run of 3-inch cast-iron pipes, six in number, and then to the purifier, which is nothing more than a heap of oxide with a small pit in the centre 3 ft. by 1 ft. 3 in. wide by 9 inches deep, for the 3-inch pipe to deliver the waste gases. This pit is covered with a wooden grid, and the oxide is heaped on to it to a height of about 2 feet.

The liquor which drains away from the superheater consists of water (derived from the steam used) containing a large proportion of sulphuretted hydrogen (liberated from the fixed ammonia on its contact with lime), and is commonly known as "devil liquor," from its offensive odour. This liquor forms one, if not the chief, of the drawbacks to the manufacture of sulphate. Up to the present, our make being so small, no difficulty has been found in draining it away into the soil of the works after conveying it some little distance from the plant. We work usually six days per month. One man is engaged when making sulphate. For such a small plant, worked irregularly, I consider the colour of the salt obtained is very fair.

The plant had been a minimum of trouble, though after it had been running a couple of years, we commenced to get a bluish salt, which caused considerable anxiety. Watch was kept on the working of the saturator for any indications of local alkalinity, and the working of the stills was carefully regulated. The trouble, however, continued. It was decided at last to open the saturator; and when this was done, the cause was found to be that the contractors had fitted an iron top instead of a lead covered top, and that, in consequence, the cyanides of the gas had attacked the iron, resulting in the formation of prussian blue. The substitution of a solid lead top remedied the matter, and no further trouble has been experienced in obtaining a good colour salt.

As to the commercial side of the position, the following figures have been got out, based upon the rate per ton of salt made:—

Wages in manufacture	£0 15 0
Acid used per ton—1 ton	2 15 9
Lime ,, ,, —30 lbs.	0 1 4
Repairs, wages, and material	0 5 0
Coke used for steam—12 cwt.	0 10 0
Total	£4 7 1

The sulphate commands a ready local market, and buyers supply their own bags. The financial results to the Company are very satisfactory; and the necessary work connected with the plant runs as smoothly as the other operations at the works, though, naturally, at the commencement some little difficulties cropped up. For instance, after the plant had been started, great difficulty was experienced in obtaining salts. This was found to be due to the use of too much steam on the stills; and the consequence was a drop in the specific gravity of the acid in the saturator. The pressure was therefore reduced, with better results; but still the yield was not what was expected. The steam was therefore further reduced down to 6 lbs. (at which we still work); and this had the desired effect. Matters went on fairly well until one day it was noticed that the waste coming from the superheater showed a large increase, which, on testing, was found to consist of raw liquor. Upon taking the superheater apart, the three pipes which ran through it were found to be very much eaten away—thus allowing the liquor to bye-pass the stills. A heavier gauge pipe (galvanized) put this to rights, and we have had no further trouble.

Sulphate plants, according to my experience, require to be handled very nicely at the start, as I believe there is no set-rule for working them. This has to be gained by experience; but once the plants are fairly in hand, there is no trouble attached to the working of them.

I certainly would recommend all gas-works of a similar size to mine, or even smaller, to have a sulphate plant, increase their revenue, and probably abate a nuisance.

Formation of Carbon Monoxide in Gas-Producers.—This is the subject of an important paper in "Bulletin" No. 30 of the University of Illinois. In noticing the paper, "Nature" says the numerous theoretical works on the processes taking place in the fuel bed of the producer have been built up on a rather slender experimental basis, and the communication fills a decided gap in our knowledge. The experiments deal more especially with the rate of the formation of carbon monoxide in the reaction $CO_2 + C = 2\,CO$; previous researches being rather directed to the study of the final equilibrium than to the rate at which the reaction takes place. Three authors have contributed to the memoir—Messrs. J. K. Clement, L. H. Adams, and C. N. Haskins—dealing with the subject from the physical, chemical, and mathematical points of view respectively. The result of this collaboration is stated to be a valuable monograph, which cannot be neglected by anyone interested in gas-producers.

THE PROPOSED INTERNATIONAL UNIT OF CANDLE POWER.

In the "JOURNAL" for the 29th of June, an abstract was given of a paper on this subject read by Mr. CLIFFORD C. PATERSON, of the National Physical Laboratory, before the Physical Society. The author subsequently sent the full text of the paper, with permission to use it after it had been published by authority of the Society. As it appears in the current number of the "Philosophical Magazine," we reproduce it.

The intercomparison of light units between the National or other standardizing Laboratories of America, France, Germany, and Great Britain has been proceeding at intervals since 1905. The values which have been obtained for the ratios between the different units are now found to be in sufficiently close accord to warrant the establishment of a working basis of agreement between this country, America, and France in the matter of a common unit of candle power. The writer has been conducting the photometric measurements connected with the work in this country, and it is the intention in this paper to give the results of comparisons which have been made, and to explain briefly those facts connected with different standards concerned which have a bearing on the agreement which has been reached.

The possibility of agreement between the British and French units was demonstrated by Dr. Glazebrook in a paper on light standards read before the British Association at Dublin in 1908.* The chief factor in the present movement has been the desire of the authorities in the United States to establish one unit for both gas and electrical industries in that country; and the possibility of their adopting a unit which should be identical with those existing in Great Britain and France led them to take the initiative in an attempt to obtain international co-operation. The agreement which has resulted has the approval of the Metropolitan Gas Referees, and now forms the subject of an announcement which is reproduced in the appendix.†

It is not necessary for the purpose of this paper to enter into a detailed description of the various standard lamps and units referred to in the memorandum. Dr. J. A. Fleming discussed the question of light standards very fully in his paper before the Institution of Electrical Engineers, to which reference should be made.‡ Some facts, however, connected with the units in question have a more especial bearing on the experimental results, and should be borne in mind in connection with the table of ratios given herewith.

The British Unit.—As defined in the above-mentioned recommendation, the unit of candle power in this country is the Harcourt 10-candle pentane lamp burning in an atmosphere at normal barometric pressure, and containing 8 litres of water vapour per cubic metre as measured by a ventilated hygrometer.

A difficulty arises in the use of all flame standards in connection with the method to be employed for measuring the humidity. When flame lamps are burning in a closed room, it is well known that their candle power diminishes, due probably to the vitiation of the air in the immediate neighbourhood of the flame.‖ Two standards will not necessarily diminish in candle power at the same rate; and it is therefore necessary to take readings after the air of the room has been changed and before the candle power of the lamps has had time to be affected. The method of measuring humidity must therefore be a rapid one; and it is now generally agreed that, from considerations of accuracy and quickness of reading, the ventilated hygrometer is the best instrument to use. In the German and French comparisons this has been used; but in the English comparisons (as reported to the Photometric Commission meeting in Zurich in 1907) the unventilated hygrometer was employed, and in the tables published in the proceedings of the Commission the author's results are given in terms of humidity measured by this instrument. The ratios tabulated in the present paper are corrected so as to be in terms of the ventilated hygrometer. In each case values are taken for the humidity at which each lamp, in the country where it forms the standard, is considered to give its nominal candle power.

The Unit of the United States of America.—In the initial adoption of a unit of candle power, the United States of America endeavoured to make its value as nearly as possible the same as that accepted at the time in this country.§ This was before Professor Vernon Harcourt and the Metropolitan Gas Referees had established the 10-candle pentane lamp on the present definite basis.

The American Institute of Electrical Engineers recommended the derivation of their unit from the Hefner lamp by increasing its value in the ratio of 0·88 : 1. This seemed at the time, from different observers' work, to be the most probable ratio between the Hefner and British units. The gas industry in America, however, did not follow this course, but developed their unit along the lines of the 10-candle pentane lamp.¶ The result is that there has been, up to now, an appreciable difference between the units adopted in the two industries in that country. The Illuminating Engineering Society and other bodies took the matter up energetically, and the Bureau of Standards at Washington now has the support of the leading institutions in America in defining the value of a common standard to be accepted throughout the States. This Institution has ascertained, by electric intercomparisons, the ratio of their present unit to those of Germany, France, and Great Britain respectively, and has arranged to adjust the value of the American unit as already indicated.

German Unit.—The unit accepted in Germany is the light given by the Hefner lamp burning in an atmosphere at normal barometric pressure, and containing 8·8 litres of water vapour per cubic metre. The researches of Liebenthal* at the Reichsanstalt, on the Hefner lamp and the variation of its candle power with atmospheric change, were the earliest systematic experiments undertaken of this nature, and are too well known to require more than passing mention.

French Unit.—The candle power unit adopted by the electrical industry in France is the bougie décimale. This is the twentieth part of the light given out by a square centimetre of platinum at the temperature of solidification. The unit was suggested by M. Violle and adopted by the Congrès International des Électriciens in 1881. This standard has been found very difficult to reproduce; and the French authorities still use the carcel lamp, burning colza oil, as the standard for all photometric work.

A determination of the value of the carcel lamp in terms of the Violle platinum standard has only been made once. This was by M. Violle himself in 1884.† Measurements were made by him using two or three photometric methods; and all his values except one showed the bougie décimale to be a little less than 4 per cent. greater than the carcel unit. A multiplying factor of 1·04 for the carcel unit was therefore given by him, and has been adopted ever since for reducing the values in terms of one standard to those of the other. As no account was taken by M. Violle of the pressure and humidity of the atmosphere in which the carcel lamp was burning, the accepted figure of 1·04 must be regarded as liable to a certain inaccuracy due to this cause. It should be remarked also,‡ that no correcting factor has as yet been determined for the variations in the candle power of the carcel lamp due to atmospheric changes. Hence, in the table given later on in the paper a correcting factor has had to be assumed in cases where the carcel lamp is corrected for a difference of humidity.

Accuracy of Comparisons.—It is well to explain, in giving the results of experiments, that different limits of accuracy must be attributed to photometric measurements of different types of standards. It is usual, in giving photometric results, to write down the fourth figure; but even in the *most favourable* circumstances this must be written small, and the value considered liable to an error of + or − 0·1 per cent. In the case of the best comparisons of electric sub-standards, this inaccuracy should not be occasioned by imperfection in the bench or photometer head, nor yet be attributed to the electrical measurements, but must, in the author's opinion, be attributed chiefly to want of constancy in the individual making the photometric observations.

In some of the comparisons which are tabulated, the electrical measurements are probably not so accurate as in others. The fuller appreciation, however, of the exact values of the national and international electrical units which has recently resulted from the labours of the International Conference, makes it possible now to attain an accuracy which leaves nothing to be desired from this point of view.

As matters now stand, undoubtedly the photometric comparisons in which the highest precision is attainable are those between properly seasoned electric glow lamps of the same coloured light. With a potentiometer which is accurate to one part in 10,000 and a substitution method of photometric comparison‖ on a bench which can be read to 0·5 mm., an accuracy is attainable with a set of good sub-standards in which the fourth figure is almost definite. When, on the other hand, comparisons are made against or between flame standards, the probable inaccuracy is greater. How much the inaccuracy is must depend largely on the flame adjustments and the consistent behaviour of the standard in question. It also depends upon the accuracy of measurement of atmospheric conditions and the precise knowledge which we have of their effect on the light of the standard lamps.

It follows from this that a relatively large number of observations must be made, when using a flame standard, if the same order of accuracy is to be attained that is possible with a much smaller number of electric comparisons. It must further be remembered, when considering the question of photometric measurements to two or three parts in a thousand, that the estimation of the height of the flame in some lamps, or the exact reproduction of the standard conditions, may not be identical when carried out by different observers. Hence it is conceivable that, owing

* *Vide* British Association Report, 1908. "The Photometric Standard of the National Physical Laboratory;" also "JOURNAL," Vol. CIII., p. 713.

† The announcement referred to was given in the "JOURNAL" for the 18th of May last (p. 439).

‡ See also paper by the author in "Journal of the Institute of Electrical Engineers," Vol. XXXVIII., p. 271.

‖ Report American Gas Institute, "Methods of Taking Candle Power of Gas," "Illuminating Engineer," 1909, p. 203.

§ Bulletin of the Bureau of Standards; Report to the American Gas Institute, on "A Unit of Light," "JOURNAL," Vol. CIV., p. 426.

¶ "The Working Standards of Light and their Use in the Photometry of Gas," Ch. O. Bond, Franklin Institute, 1908, "JOURNAL," Vol. CII., p. 29.

* "Zeitschrift für Instrumentenkunde," Vol. XV., 1895, p. 157.

† Séances of the French Physical Society, May to July, 1884.

‡ "Rapport de Trois Lampes," Laporte et Jouaust, Bull. Soc. Inst. des Elect. IIe Série, Tome VI., No. 58.

‖ See "Photometry of Electric Lamps," by Dr. J. A. Fleming, M.A., F.R.S., "Jour. Inst. Elec. Eng.," Vol. XXXII., p. 144.

TABLE *giving Determinations of the Ratios of National Candle-Power Units from* 1903 *to* 1908.

Pentane = British. Bougie Décimale = French. Hefner = German. Bureau of Standards = U.S.A.

		Electric Comparisons.									Direct Comparisons.			
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Tests conducted by		Sharp, 1903.	Paterson, 1905.	Fleming, 1905.	Hyde, 1906.	Laporte & Jouaust, 1907.	Laporte, 1907.	Rosa, 1908. Spring.	Rosa, 1908. Autumn.	Laporte, 1908.	Paterson.	Liebenthal.	Perot & Laporte.	Photometric Commission, Zurich,* 1907.
Number of Lamps		..	6	3	12	6	2	12	6	11	..	..	..	..
A	Hefner / Pentane Unit	..	0·890	0·885	0·898	0·908	..	0·896	..	..	0·902	0·904	0·921	0·902
B	Bougie Décimale / Pentane Unit	..	..	..	0·998	1·018	1·005	1·008	..	1·008	1·009	1·009	1·019	1·008
C	Bur. of Standards / Pentane Unit	..	..	..	1·016	..	..	1·015	1·016	..	..	..	..	..
D	Pentane Unit / Hefner	..	1·128	1·130	1·120	1·101	..	1·116	..	..	1·109	1·106	1·086	1·109
E	Bougie Décimale / Hefner	1·118	..	..	1·116	1·113	..	1·124	..	..	1·118	1·116	1·117	1·118
F	Bur. of Standards / Hefner	..	..	..	1·138	..	..	1·131	..	..	..	..	..	..
G	Pentane Unit / Bougie Décimale	..	..	..	1·002	0·987	0·997	0·992	..	0·992	0·991	0·991	0·981	0·992
H	Hefner / Bougie Décimale	0·894	..	..	0·896	0·898	..	0·890	..	..	0·894	0·895	0·895	0·894
I	Bur. of Standards / Bougie Décimale	..	..	..	1·018	..	..	1·006	..	..	..	..	..	..
J	Pentane Unit / Bur. of Standards	..	..	..	0·984	..	..	0·985	0·984	..	..	..	..	..
K	Hefner / Bur. of Standards	..	..	..	0·879	..	..	0·884	..	..	..	..	..	..
L	Bougie Décimale / Bur. of Standards	..	..	..	0·982	..	..	0·994	..	..	..	..	..	..

* Pentane values corrected to a humidity of 8 litres of water vapour per cubic metre of air.

to this cause, the observations in one laboratory on some flame standard may differ consistently by a small amount from those in another on the same standard. This, however, is not the case when electric sub-standard comparisons are made, if the electrical measuring apparatus is accurate. To a certain extent, therefore (in some cases more than others), a flame standard needs to be "interpreted" when its absolute value is desired to a high accuracy.

The value of electric sub-standards comparisons thus becomes apparent. If (as is generally the case) a laboratory has sets of electric sub-standards which have been compared at intervals for years with the primary flame standard whose value they represent, an opportunity is given for realizing the absolute value of this unit to an accuracy which could hardly be attained with certainty by others who might endeavour to reproduce it in a single set of observations, however carefully made. When these electric sub-standards are intercompared through the medium of a travelling set of lamps, there is no reason why we should not obtain accurate knowledge of the relative values of the different units as each is interpreted in the country where it is the recognized standard.

The ratios between the four units of light given in the table are the results of measurements which have been made at the specified laboratories in the four countries concerned. Other determinations were made previous to these; but the standards used for obtaining the British unit were of several different forms, and the atmospheric conditions have not always been taken into consideration. I have deemed it desirable, therefore, to insert only the more recent determinations, in all of which the 10-candle Harcourt pentane lamp has been used, and atmospheric changes have been allowed for.

The table is divided into two portions. Columns 1 to 9 give the various ratios obtained through the medium of electric lamps which have been measured at some or all of the laboratories. These have been chiefly initiated by the Americans, who have from time to time sent sets of lamps to Europe to have values assigned in London, Paris, and Berlin. It is not suggested that all the results in the table should receive equal weight. In some of the electric comparisons, the conditions allowed of a greater accuracy than in others, when fewer lamps were employed and time only allowed a single set of measurements to be made.

Columns 10, 11, and 12 contain the values which resulted from the intercomparison of flame standards undertaken at each of the laboratories. These were initiated by the International Commission on Photometry, and gave a set of ratios which brought the knowledge of the relative values of the candle-power units to within an accuracy of about + or − 1 per cent. As in the case of the electric comparisons, the conditions in some cases probably allowed of a higher accuracy than in others; but the results of all the measurements have been tabulated, so that the bearing may be seen of each on the agreement which has been established.

The first series of ratios (columns 1 to 9) may therefore be regarded as representing the ratios of the standards as they are interpreted in the countries to which they belong; while in the second series we have the interpretation of the values of the standard lamps by experimenters who are not so accustomed to their manipulation.

Lines marked A, B, C, give the values of the standards in terms of the pentane unit; D, E, F, give them in terms of the Hefner lamp; and, similarly, other sets are in terms of the bougie décimale and the Bureau of Standards candle.

Without going into detailed comments upon the experiments from which each ratio in the table is derived, it will suffice to say that, as far as the electric lamp comparisons are concerned, the greatest stress should be laid on the results in columns 4 and 7. This is partly on account of the large number of lamps employed, and also because of the more prolonged measurements made. Line J illustrates the high accuracy it is possible to secure in comparisons of this nature.

In the certification of glow lamps in terms of the Hefner unit, the Reichsanstalt only give candle-power values to the nearest 1 per cent. If the average of ten or twelve lamps is taken, the error introduced is probably not great; but when the number is small, appreciable inaccuracies may be introduced into the mean, and the rather low value obtained by Fleming in 1905 may be attributed to the fact that only three lamps were tested.*

As regards the flame-lamp comparisons, it will be noticed that Perot and Laporte (column 12) found a value for their pentane lamp which was appreciably lower than that obtained by other observers. Except for this difference, the agreement between the ratios is fairly close. The exceptionally close agreement shown in columns 10, 11, and 12 for the ratio "bougie décimale: Hefner" can only be attributed to a coincidence, since in the experiments

* See "Jour. Inst. Elec. Eng.," Vol. XXXVIII., p. 311: Discussion by Dr. Fleming of the author's paper on "Investigation of Light Standards."

from which two of the three ratios were determined the observations varied between 3 and 4 per cent. from the mean.

The chief point of interest in these comparisons is the near coincidence of the values of the bougie décimale with that of the pentane unit, as indicated by lines B and G. An inspection of these values indicates that the bougie décimale, as interpreted by the Laboratoire Central, may be slightly larger than the pentane unit; but the amount is less than 1 per cent. When we remember that, at present, the value of the bougie décimale depends on the interpretation of the carcel lamp and the ratio between it and the platinum unit, determined by Violle in 1884, it must be admitted that this small apparent difference is well within the limits of the errors of experiment.

The second point to notice is the difference of 1·6 per cent. between the units of the Bureau of Standards and the National Physical Laboratory.* It is generally recognized that the unit at present adopted by the gas interests in the States is about 4 per cent. smaller than the Bureau of Standards unit. It will then be seen that by lowering the value of their unit by 1·6 per cent. the Bureau comes into exact agreement with this country, and approximately halves the difference between the units employed by the gas and electrical industries in the States.

A further point of interest and importance which results from the comparisons (see line A in the table) is that the Hefner unit is in the ratio 9:10 to the new candle. The French authorities have for some time taken the ratio "Hefner: bougie décimale" as 0·895. It is of interest, therefore, to see, from lines A and H, how nearly the value for the Hefner unit, in terms of both pentane and bougie décimale units, approaches the figure 0·90. The mean of all the ratios "Hefner: pentane" comes to $0{\cdot}90_0$, and those of "Hefner: bougie décimale" to $0{\cdot}89_5$. So that though the comparisons between the pentane and bougie décimale units indicate a difference of 0·8 per cent., the same units compared through the Hefner standard only appear to differ by 0·5 per cent.

[Appended to the paper is the announcement referred to in the second footnote on p. 383.]

DUTCH GAS MANAGERS' ASSOCIATION.

General Meeting at Utrecht.

THE Thirty-Seventh General Meeting of the Association of the Gas Managers of Holland was held on the 7th and 8th ult., in the Tivoli Park at Utrecht. The following report of the proceedings is taken from our Dutch contemporary, "Het Gas," which is the official organ of the Association.

The members of the Association were received and entertained on the evening of Tuesday, July 6, by the Gas Committee of Utrecht, on behalf of whom the Chairman, Alderman Dr. A. W. van Zijst, spoke a few words of welcome. The meeting was formally opened on the following day by the President of the Association, Heer J. E. H. Bakhuis, the Manager of the gas undertaking of The Hague, who delivered an Inaugural Address, of which the following is a summary.

President's Address.

The generally depressed industrial conditions of the year 1908 had had their effect on the gas industry. The smaller growth of population resulted in a smaller increase in the output of gas. Coal was bought at high prices, because most of the gas-works had concluded their contracts before the fall in the price of coal set in. The high cost of coal was not counterbalanced by the price obtained for coke, because the coke market followed the depression of the coal market. The prices of coal tar and ammonia were low, and up to the last no permanent improvement in them can be looked for. Coke-ovens were now recovering these products to a much greater extent; and the flooding of the market from England had always to be feared. For coal tar, however, a limit was set by its value as fuel. The year 1909 had opened more favourably for the gas industry, because of the low prices of coal and oil, which would effect a reduction in the cost of manufacturing gas.

Passing on to what had, it was known, been done since the previous summer towards the solution of the carbonizing problem, the speaker referred to the favourable results obtained from vertical retort-settings and from the Munich chambers with sloping bottoms, and to the advantage of continuing distillation with the former for a further hour and admitting steam during that time. Chamber carbonizers of other types had also been constructed. Large gas-works should give attention to the large-scale trials at Rotterdam, and small works to the small-scale trials at Maastricht. In England, endeavours to achieve continuous working appeared to have produced practical systems. The reports from Liverpool, where Messrs. Woodall and Duckham had erected plant, and from St. Helens, where there was a Glover-West plant, showed a good make of gas and yields of tar and ammonia, and coke of better quality; while quenching was almost unnecessary, little labour was required, and there was no dust or smoke. In a word, the working was ideal. Interesting results of carbonization at low temperatures, with the object of producing a smokeless fuel, had been published from Plymouth. The Municipality of Utrecht, and Heer Dr. J. J. Neurdenburg, the Gas Manager, deserved thanks for undertaking a trial of the Rincker and Wolter system of coal, oil, and tar gas-production, the results of which were being looked forward to with interest.

The object of all these methods was to lower the cost price of gas, and thus give the gas man an advantage in competing with electricity. Electricians advertised on a large scale the virtues of the new metallic filament lamps; and it now behoved the gas manager to direct attention to the inverted incandescent burner, which showed an economy of 30 to 40 per cent. compared with the upright burner. For public lighting, the inverted high-pressure gas light can hold its own with the most advanced arc lamp. Installations of it occur at Utrecht and at Rotterdam. Attention should be given to facilities for convenient and efficient attention to the gas-lamps, as in this respect electricity still had an advantage. Heer Brender-à-Brandis had started in May a first course of instruction in gas supply at the Technical College at Delft. There were also courses for gas-fitters at Amsterdam, Rotterdam, The Hague, and Haarlem. As proof of the vitality of the gas industry, it might be pointed out that new gas-works had just been finished, or were under construction, in fourteen Dutch towns or villages, and concessions for the supply of outlying places from other works were under consideration.

After referring to the Livesey Memorial Fund, and to the losses the gas industry had sustained by deaths in Holland (Heer F. A. Holleman, of Leyden, Heer G. Peck, of Amsterdam, and Heer S. R. Stokvis, of Rotterdam) and in Germany, the President stated that the membership of the Association had increased by 19 since last year, and now amounted to 416.

Officers for the Ensuing Year.

The election of officers for the year 1910 resulted in the choice of Heer J. van Rossum du Chattel, of Amsterdam, as President, and of Heeren J. Bauduin, of Maastricht, W. F. Payens, of Nijmegen, and M. C. Sissingh, of Rotterdam, as Members of the Council. Heer N. W. van Doesburg, of Leyden, was appointed Editor of "Het Gas," and Heer W. K. N. Geerling, of Amsterdam, was elected a member of the Committee for the Benevolent Fund of the Association. Brussels was chosen as the place for next year's meeting. The reports of the Treasurer and Auditors on the accounts of the Association, and of the Committee of the Benevolent Fund, were received; and the necessary elections in connection therewith were made for the ensuing year.

Report of the Photometry Committee.

The report of the Committee on Photometry of the Association stated that comparative tests, of which the results will be published, had been made with a Junkers calorimeter, and the new Simmance-Abady portable calorimeter. Reference was also made to the adoption of the "International Candle" as its photometric unit by the Bureau of Standards at Washington, and to the concurrence of the English and French laboratories in its general acceptance. The English Gas Institution had approached the Dutch Association with a suggestion that it also should accept the "International Candle" as its unit of light. The Dutch Photometry Committee, however, considered that before this was agreed to the "International Candle" should bade opted by the International Photometric Commission at Zurich; and this view was endorsed by the meeting. A sum of 250 florins (about £21) was voted for the expenses of a delegate of the Association in attending the Congress of the International Commission at Zürich next summer.

Report of the Coal Committee.

The Coal Committee of the Association reported that, though it had been at work for five years, little or no progress had as yet been made in accomplishing the chief object with which they were appointed—the establishment of a Central Association for the purchase and sale of raw materials and bye-products for Dutch gas-works. They are of opinion that this aim must be relegated to a distant future. It may be partially attained by those gas-works which are similarly circumstanced joining together, and ultimately, by enlarging their circle, effecting the object of the projected central organization. In a few cases, two or three gas-works have already combined for the purchase of raw materials. An attempt early this year of four gas-works to work together thus had, however, proved abortive. The Committee had received information from 26 gas undertakings in regard to the purchase of coal. Their report also gives a review of the gas coals purchased in 1908, and the quantities of tar, liquor, and sulphate made. Reference is made to the proposal Professor Constam, of Zürich, brought up at the recent Congress of Applied Chemistry in London, for the International adoption of the method of the American Chemical Society for the determination of volatile matter in coal, with a view to securing general uniformity in regard to the valuation of coal (see "JOURNAL," Vol. CVI., p. 584). The Dutch Committee regard Professor Constam's proposal as a first step in the direction of attaining international agreement in the examination of coal. The Committee proposed, and the meeting agreed, that Dr. Terneden, of Amsterdam, should prepare a *brochure* to serve as the basis for an international conference on this question. It was anticipated that there would be a congress arranged to deal with it before long. The meeting voted the

* Dr. A. C. Humphreys, Report of the Committee on Nomenclature and Standards, Annual Convention of the Illuminating Engineering Society, Oct. 5, 1908.

necessary sums for the continuation of the work of the Committee and the preparation of the *brochure* referred to.

Other Technical Committees.

The Committee of the Association appointed to advise in regard to the training of gas-fitters reported on the sale of a "Handbook for Gas-Fitters" which had been prepared at the instance of the Association. They urged other gas undertakings to follow the example of those at Amsterdam, Haarlem, The Hague, and Rotterdam in providing courses of instruction for gas-fitters.

The Committee on the establishment of a standard of valuation for the purchase of gas oil reported that they aimed at adopting a method based on the quality of the oil as ascertained by laboratory trials. The members of the Committee have been conducting tests, from which it appears probable that they will recommend laboratory gas-making trials for the valuation of oil. But various investigations have still to be made before a clearly defined method can be propounded.

The Papers Presented.

Passing on to the technical communications, the first was a paper read by Dr. J. J. Neurdenburg, of Utrecht, on Oil-Tar Gas Manufacture. The process described by him is a Dutch invention, and is said to be simpler than carburetted water-gas manufacture, for which three vessels in series are required, whereas the new process needs only one vessel. The proportion of carbonic oxide in the gas can be kept below 5 per cent. At Utrecht, the gas is made from a mixture of two-thirds gas oil and one-third water-gas tar. After thorough mixing in a vessel with stirring apparatus, this mixture is fed into a reservoir and pumped thence into the generator, which is filled to about seven-eighths of its capacity with blast-furnace coke. The mixture passes through an oil-meter, and is sprayed on the bed of incandescent coke. The sequence of working is as follows: A "blow" or air-blast lasting 1½ to 2 minutes; introduction of oil and tar for 2 to 3 minutes; a downward run of air or steam of a quarter minute, for the purpose of avoiding the loss of the gas present in the generator; and a subsequent steam-blast of one minute, mainly in order to clean the sprayer. The "blow" is then started again. The valves, &c., are all operated from a central point. The whole apparatus at Utrecht, inclusive of two oil-tanks, cost about £8300. It has a productive capacity of about 620,000 cubic feet of gas per diem. A second set of plant, doubling the productive capacity, would cost rather less than £4000. There are consumed in the production of 1000 feet of gas, having a calorific power of 550 B.Th.U. per cubic foot and containing 5 per cent. of carbonic oxide, 62·4 lbs. of the mixture of two-thirds gas oil and one-third water-gas tar, and 3·1 lbs. of coke. The cost of the gas, as compared with coal gas and carburetted water gas, at the prices prevailing for coal, oil, coke, and water-gas tar in Holland, is as follows:—

Coal gas	1s.	11½d.	per 1000 cubic feet.	
Oil-tar gas	1	10¼	"	"
Carburetted water gas . .	1	7¼	"	"

One advantage of the process is that, by increasing the temperature of the generator, gas of a very low specific gravity can be manufactured. The proportion of hydrogen can be raised to 85 per cent. without difficulty, so that the process is valuable for balloon supplies.

Communications were then made by Heer Smulders, of Utrecht, on a Fast-Running Exhauster in use at the Utrecht Gas-Works (which was subsequently inspected by those attending the meeting); by Heer J. Diephuis, of Amsterdam, on the Woodall and Parkinson Expansion Nipple; and by Herr F. Lux, of Ludwigshafen on the Rhine, on a New Electric Distance Lamp Lighter and Extinguisher. In regard to the last, it was mentioned that the number of applications for patents for distance lamp-lighters and extinguishers was over 200, of which 60 to 70 were for electrical devices. The Lux apparatus was stated to work without hitch, and to admit of any number of lamps being controlled from a central point. Although too costly for use in street lighting—new installations cost £4 to £5 per lamp—it should prove serviceable in large salons and buildings.

Heer Th. A. Van-der-Horst, of Delft, showed a water-slide fitting, which was free from the usual objectionable feature. If the water-seal in it were broken, no escape of gas occurred, but the lights were extinguished. A discussion followed on vertical retorts and carbonizing chambers. Retort-house governors, which have not hitherto found application in Holland, were next considered. Favourable results were stated to have been obtained in the East Indies by the use of coal and breeze as fuel for retort-furnaces in place of coke. Some discussion ensued on the use of coal tar as a fuel in boiler-furnaces. The question of the abstraction of naphthalene by slow condensation of coal gas was raised; and it was stated that Klönne's chamber condenser, which effects condensation gradually, causes more naphthalene to be taken up by the tar than is taken up with the quicker action of ordinary condensers. Washing the gas with heavy oils, anthracene oil, &c., has proved quite satisfactory. From 0·0145 to 0·0187 gallon of oil is required per 1000 cubic feet of gas. It was mentioned that modifications of the Jäger purifying grids, which had been made at the Amsterdam Gas-Works, had effected a considerable reduction in the wear and tear of the grids. The sediment, consisting of a great deal of water and a little tar and soot, which is obtained in carburetted water-gas manufacture, was said to depend largely on the quantity of scrubbing water used. The formation of a great quantity could be prevented by limiting the amount of water sprinkled into the scrubbers. A separator may be employed for removing the sediment from the water-gas tar. The admixture of warm coal gas with cold water gas was stated to result in the various oils, which otherwise would be deposited, being retained by the gas.

Tests of the Junkers self-registering gas-calorimeter had proved it to give trustworthy results. The Fahrenheim calorimeter had been tried at Dessau, Amsterdam, and Hilversum; and the tests had shown that as a scientific and technical instrument it was quite worthless. In consequence of complaints lodged with the Administrative Board of North Holland, of nuisance arising from the manufacture of sulphate of ammonia at the Eastern Gas-Works at Amsterdam, the question of the best method of rendering the evil smelling gases inoffensive was considered. The two most usual means of disposing of them—viz., leading them into a high chimney stack, and burning them in the grate of a boiler—were not satisfactory. The first means was ineffective, and the second was attended by corrosion of the boiler plate. A special furnace was therefore erected at Amsterdam, consisting of a grate with a superposed combustion chamber for the noxious gases. No trace of sulphuretted hydrogen could be detected at the outlet of this furnace, so that its action was satisfactory. But the fuel consumed raised the cost of manufacture of the sulphate of ammonia by about 8d. per ton.

The question of protecting thin steel pipes by coating was discussed; and the well-known Angus Smith method, which is commonly named in specifications, was condemned. At Amsterdam, it was stated that the pipes after warming were wrapped round with strips of jute soaked in melted pitch, and then painted therewith. The results were good. Mention was also made of the preparations for coating pipes of Messrs. Wm. Briggs and Sons, Limited, of London and Dundee. Discount or reduction gas-meters for use where gas for cooking or heating is supplied at a lower price than for lighting, formed the next subject of debate. The Thorp and Marsh pattern had given good results at Amsterdam and Maastricht. The firm of Elster and Co., of Rotterdam, also made a small gas-meter, which could be stamped at the Dutch Standards Department, and was sold for about 16s. 8d.

It was stated that the good results reported last year to have been obtained in Amsterdam with copper cellulose mantles for public lighting had been confirmed by further use. Various types of inverted burners were exhibited in the meeting room. Messrs. Pintsch showed a cradle for supporting the fragments of an inverted mantle in case of its fracture, so as to ensure some light being maintained in that event. It was reported that rubber connections to boiler-rings, &c., which were the cause of accidents, had been replaced at Amsterdam by copper tubing, which, owing to its greater durability, proved cheaper as well as safer. Instructions were given for articles to be published in "Het Gas" on Electro-Technology in so far as it bore on the competition of electricity with gas.

The festivities in connection with the meeting included a dinner and concert at the Tivoli Park on the 7th ult., and the official banquet at the Hotel Boschlust, at Zeist, on the next day, which also was followed by a concert. The meeting was attended by 193 members of the Association, including the honorary members Heeren W. de Liefde and C. T. Salomons.

Preventing Tar from Flowing from the Tar-Well.—Herr R. Pettner has taken out a German patent for a device for preventing tar from flowing with the ammoniacal liquor out of the tar-well. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," an overflow pipe is provided through which the liquor floating on the tar flows out into the reservoir. At the bottom of the limb of the pipe dipping into the liquor is fixed a saucer with a hole in the centre and with several short inclined pipes projecting downwards between its centre and circumference. From the central hole a short conical pipe rises within the overflow-pipe. As the liquor ascends in the conical pipe and then in the overflow-pipe, any entrained tar tends to settle and flow back down the outside of the conical pipe into the saucer, and thence through the short inclined pipes back into the well.

Improvements in Internal Combustion Engines.—The current issue of "Nature" contains the first of a series of articles on this subject, by Mr. H. E. Wimperis. The author considers that we are only at an intermediate stage in the development of the internal combustion engine, which gives us a bigger return for the heat put in than any other known form of engine. He says that it is impossible to imagine the development of the future "going back," so to speak, on such an advance as this. The internal combustion engine must come, and existing steam-engines be replaced. This means the supersession of the steam-turbine and the advent of the gas-turbine. Numbers of men are working at the problem which it presents; but little has as yet been published as to the result of their labours. This is a clear indication that the many difficulties are not yet mastered. The author thinks the present stage in the development of the internal combustion engine is a convenient one at which to summarize briefly what has been done in regard to its improvement; and therefore he proposes in this series of articles to state the problem and the lines on which, with such a striking measure of success, its solution has been attempted.

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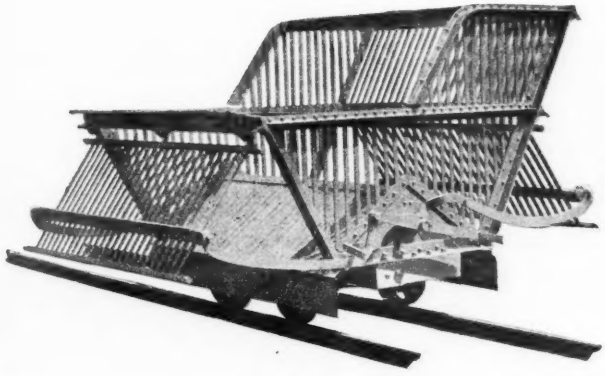

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REGISTER OF PATENTS.

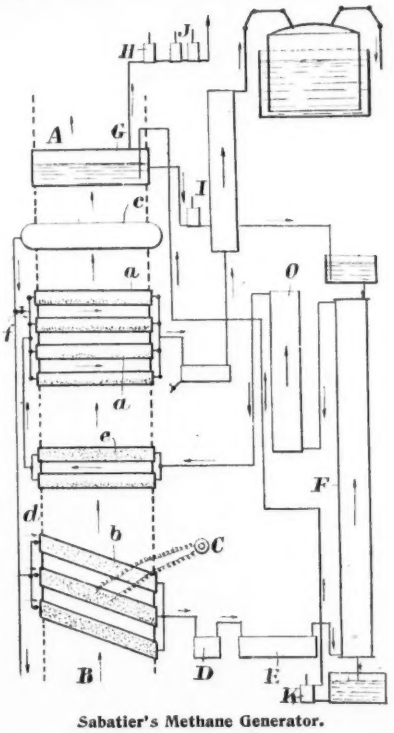
Manufacture of Methane or Mixtures of Methane and Hydrogen.

SABATIER, P., of Toulouse, France.

Nos. 14,971 and 27,045; July 14, 1908.

These applications (the latter of which was ante-dated from Dec. 12 to July 14, 1908) relate to a process and apparatus for the manufacture of methane or of mixtures of methane and hydrogen, by passing water gas over heated nickel.

Such manufacture, the patentee points out, has been effected hitherto by producing water gas in some suitable manner, depriving it of carbonic anhydride with the aid of an alkaline carbonate, and finally passing the gas over heated nickel. This process "has never produced good, practical results," on account of the following reasons: (1) The water gas constantly varies in composition, and as the whole operation is based on a definite composition of the gas, the process soon becomes defective; the hydrogenation becomes insufficient; the nickel is carbonized; and after a short time the operation has to be stopped. (2) The carbonized nickel has to be regenerated; and an operation of this kind requires time and expense. Either two sets of apparatus have to be used or else the carbonized nickel must be removed and replaced by a fresh quantity.



Sabatier's Methane Generator.

Attempts have been made to avoid the deposit of carbon on, and between, the particles of nickel by adding steam to the water gas. This process is, however, costly, owing to the auxiliary production of steam; further, "it has never produced satisfactory results, as the exact composition of the mixture of gases was not known." By using the process which constitutes the present invention, all these disadvantages may, it is said, be avoided, and the operation may be carried out in a regular manner without any interruptions.

The invention is characterized by the fact that the water gas used has a constant composition which is obtained by observing a constant temperature in the apparatus for producing it. The water gas is subsequently deprived of carbonic acid in two stages; it is treated first of all with sodium carbonate in any known manner, and is afterwards passed through a dilute solution of sodium hydrate. In this double operation for removing the carbonic acid, the gas becomes so moist that it can be passed on to the nickel for the purpose of combining it with the hydrogen without adding water vapour. No carbon is deposited in the process, and a mixture of gases is obtained that always contains the same proportions of methane and hydrogen.

I.—*Manufacture of Water Gas of a Definite Composition.*

The water gas is manufactured in apparatus A, fitted with bent tubes or straight, horizontal, or inclined tubes *b*. The superheated steam produced in the generator *c* passes through *d* to the coke (anthracite, wood, charcoal); the latter being heated by a furnace B heated with coal or (preferably) by the gases produced by a Siemens generator. A pyrometer C with constant indications—such as a Le Chatelier's thermo-electric pyrometer—will allow of the average temperature in the tubes *b* being determined. A cock *f* is provided between the steam-pipe *d* and the tubes *a*.

The composition of the water gas depends: (1) On the temperature of the coal; (2) on the nature of the coal. The higher the temperature, the smaller the proportion of carbonic acid. The amount of carbonic acid contained in the gases can easily be determined. If this is about 20 per cent. by volume, the gas is just in condition for the manufacture of pure methane. A reading is taken with the pyrometer, and it is sufficient to keep the temperature at the degree it has attained. If the proportion of carbonic acid gas is lower than 20 per cent., the generator is too hot, and the heating must be regulated so as to attain the proportion required. If a mixture of methane and hydrogen is to be prepared, the temperature must be lowered until the pyrometer shows a temperature that corresponds to the proper proportion of carbonic acid gas. In a generator fed with light coke, the proportion of 20 per cent. of carbonic acid corresponds to 970° read off the pyrometer. At 780°, 24 per cent. of carbonic acid is obtained and 12 per cent. of carbon monoxide. This mixture ought to yield about 33 per cent. of methane and 67 per cent. of hydrogen.

The water gas prepared in this manner is washed at D and cleaned at E, with a Laming mixture, before being deprived of carbonic acid.

When ordinary gas for lighting purposes and methane are to be prepared simultaneously, ordinary gas-works retorts may be used for generating water gas by introducing water vapour before the glowing coke is removed—such water vapour being afterwards transformed into methane.

II.—*Removal of the Carbonic Acid.*

The gas to be deprived of carbonic acid is passed in at the bottom of a vertical column F, down which a sodium carbonate solution flows. The liquid that runs out contains, of course, sodium bicarbonate, which is passed into boilers G, heated with the hot gases that come out of the water-gas furnace, by means of a pump K. In these boilers carbonic acid gas is given off. The production of carbonic acid gas by the decomposition of the bicarbonate may be facilitated by aspirating with a pump H. The liquid that finally contains the neutral carbonate only is brought back to the column F by pumps I; and the whole operation is started over again.

The carbonic acid gas cannot, however, be completely removed in this manner, owing to the fact that the sodium carbonate does not absorb the gas completely, because of the readiness with which the sodium bicarbonate breaks up, especially at the temperatures prevalent in summer. The removal of the carbonic acid is completed by passing the gas through a small column O in which a dilute solution of potassium or sodium hydrate is made to circulate, or else through chambers in which a layer of slaked lime is spread out.

If potassium hydrate is used, or sodium hydrate, the material is recuperated from time to time by heating it with lime. In the case of potassium hydrate, the resulting carbonate of lime retains a little potassium hydrate, and may subsequently be made use of in agriculture as a fertilizer.

The carbonic acid that escapes from the boilers G may be liquefied at J by compression in any known manner, and may be placed on the market as liquid carbonic acid.

III.—*Production of Methane in the Nickel Tubes.*

The practical method of carrying out this reaction depends on the following conditions: (1) The initial cleaning of the gas. (2) The arrangement of the apparatus. (3) The preparation of the nickel. (4) The way of conducting the operation.

(1) The gas, deprived of carbon dioxide at O, consists of a mixture of carbon monoxide and hydrogen. It must be freed from traces of sulphur compounds that it may contain; and for this purpose it is made to pass through tubes *e* containing copper in the shape of turnings or of a fine powder. These tubes are built into the water-gas furnace A B above the carbon tubes, and must be maintained at a temperature between 500° and 600° C. The copper, heated to dark red, withholds any impurities that might deteriorate the nickel. After long use, the copper becomes partly transformed into copper sulphide, and must be renewed. The copper sulphide may be submitted to a roasting process so as to obtain copper oxide, and the latter may be restored to metallic copper by treating the oxide with the gas to be purified.

(2) The apparatus for the production of methane consists of horizontal metallic flattened tubes *a*, into which flat receptacles containing nickel are introduced. These tubes are arranged in series in furnaces heated by the hot gases of the water-gas furnace. A cock *f* is provided between the steam-pipe *d* and the pipe connection of the tubes *a* for the admission of steam or water to the tubes, in order to clean them. Each tube may also be provided with a valve, so that each may be cleaned separately. Vertical cylinders may likewise be used that are supplied with horizontal plates on which the nickel is placed; the gases being made to circulate round these plates. The hot gases of the water-gas furnace are made to heat successively (after heating the carbon tubes *b*) the tubes *e* provided with copper, the tubes *a* or the horizontal plates for producing methane, and, finally, the boilers G for decomposing the sodium bicarbonate.

(3) The nickel producing the catalytic reaction must be in a powdered condition, and is obtained by reducing ordinary nickel oxide in the apparatus used for carrying out the present invention. The oxide is reduced by applying the mixture of carbon monoxide and hydrogen that issues from the copper tubes. The reduction ought to be effected between 350° and 450° C.

(4) The tubes (or flat cylinders) for the nickel are grouped in several series that are independent of one another, so that one series may be emptied, filled again, and reduced without interrupting the whole operation.

(5) The formation of methane is effected preferably at 350° C.; but the temperature may vary between 300° and 450° C. without involving serious disadvantage.

Coin Controlled Gas-Meters.

STONEHAM, J. A. & F. A., Bickley, Kent.

No. 15,186; July 17, 1908.

This invention has for its object the provision of means whereby, when a given number of coins have been inserted into the meter, they can be exchanged for a coin of higher denomination, but equivalent value to the aggregate value of the coins released.

The patentees show, as an example, the type of coin-operated meter described in patent No. 25,272 of 1894 with which they have combined their invention to show its applicability to a gas-meter.

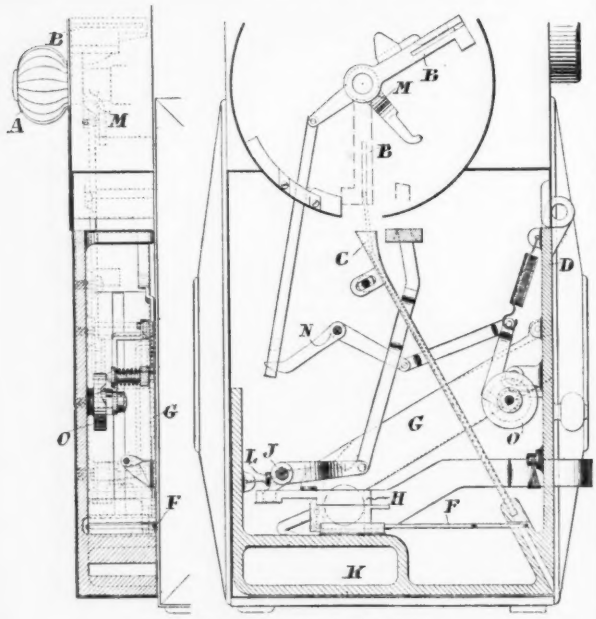
To the external handle A is fixed an ordinary coin-carrier B, which,

when carrying a coin and being turned into the vertical position (shown in dotted lines), delivers the coin into the coin-shoot C, disposed immediately beneath the carrier, and contained within the casing D, which is inserted into the space at the side of the meter provided for the coin-drawer, and secured therein by a padlock in the usual way.

The coin-shoot has a shutter adapted to close it and to collect the coins so that they are supported on one end at the edge; the distance between the shutter to the rotary carrier B being such that, when the sixth penny has been brought round by the carrier and dropped into the shoot, the fifth penny supports it at such a height as to lock the rotary carrier from movement in a reverse direction until such time as the shoot has been discharged of the six pennies collected in it.

In order to effect this purpose, a second shoot is arranged with its outer end open to the exterior of the meter, so that a coin of high denomination—say a sixpence—can be placed in it, which coin rolls down the inclined shoot into a carrier consisting of two parts, the upper part H provided with a handle outside the meter and a lower part to which the shutter F is attached. The lower part carries at its rearward portion a pivoted catch having an arm extending into the space inside the carrier, so as to come into the path of the coin in such a way that the weight of the coin operates the catch and releases it from engagement with a fixed stop. The sixpence then rests on the pivoted floor of the lower part. If the handle is now withdrawn, the part H of the carrier, by means of the sixpence, moves the shutter F until the opening formed in it coincides with the line of the shoot and allows the column of pennies to pass from the apparatus through the external orifice.

In order to lock the rotary carrier B from reverse motion, the part H has an extension which engages with the bell-crank lever J, to the lever arm of which is pivoted a rod sliding in the guiding bracket carried by the upper part of the casing D. When the bell-crank is in the position into which it is moved when the handle on H is pulled into its extreme outer position, the upper part of the rod shown in dotted lines comes into the path of the carrier B, and prevents it being rotated backwards into a position to receive a fresh coin.



Stoneham's Coin-Controlled Meter.

When the lower part of the sliding carrier reaches its extreme right-hand position, the pivoted floor swings round into the slot in the sixpenny till K and allows the coin to drop into the till. On the return motion of the lower handle to reinstate the mechanism ready for receiving another sixpence, the upper part of the carrier H abuts against the projection carried by the lower part and lifts the pivoted floor by the contact of the latter with the end of the slot. When this lower part reaches its extreme left-hand or rearward position, the catch automatically engages with the nose of the stop and prevents any movement of the shutter F until a further sixpence has been inserted in the coin slot; the spring L, attached at one end to the casing D and at the other end to the connecting pin, is adapted to retain the bell-crank in its two extreme positions.

In order to prevent a sixpence being placed in the sixpenny slot until six pennies have been inserted into the penny shoot C, there is loosely pivoted about the centre of the rotary carrier B, a bell-crank M, one arm of which is engaged by the penny when held in the rotary carrier B, while the other arm is attached to a rod, a bridle on which co-acts with one arm of the bell-crank N, the other arm being connected with a lever attached to a pin on which is pivoted a cam O. At the side of the sixpenny coin-shoot is provided a spring-pressed bolt, one end of which passes through a hole into the coin-shoot G, so as to form an obstruction to a sixpence when put in; the opposite end of the bolt engaging with the lateral face of the cam O in such a way that, when the end of the bolt trips into a recess on it, the sixpenny coin-shoot G is left without obstruction. But when the bolt is moved laterally in being pushed out of the recess, the end of it passes into, and forms an obstruction in, the shoot G.

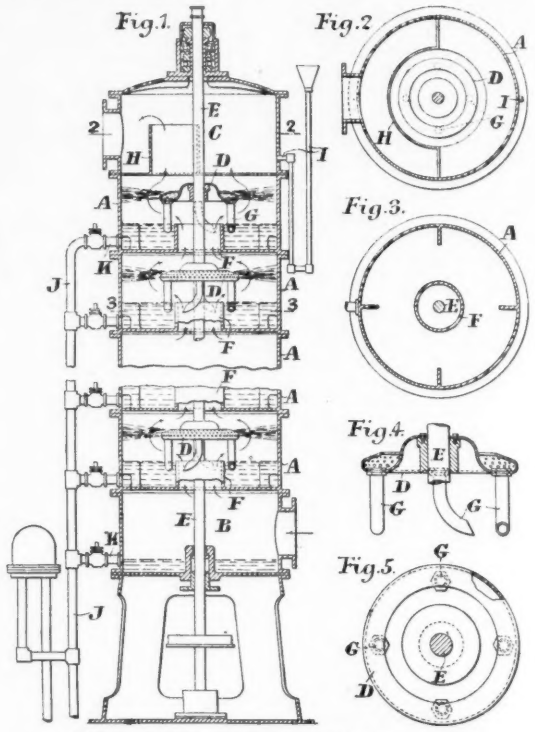
There are six teeth on the ratchet wheel; and as the lever is moved by the bell-crank N every time a penny is carried round by the rotary carrier B and dropped into the shoot C, it follows that the sixpenny shoot G is always obstructed, except when the last or sixth penny has been dropped into the shoot G.

Effecting Intimate Contact of Liquids and Gases.

KIRKHAM, HULETT, and CHANDLER, LIMITED, and HERSEY, S., of Palace Chambers, Westminster, S.W., and BLAKE, E. W., of South Croydon.

No. 18,129; Aug. 28, 1908.

This invention is particularly designed for the extraction of ammonia and other impurities from coal gas by means of apparatus wherein the gas to be purified passes through a vessel in which the liquid is projected in the form of spray.



Kirkham, Hulett, and Chandler's Vertical Washer.

Fig. 1 is a sectional elevation of the apparatus. Fig. 2 is a section on the line 2. Fig. 3 is a section on the line 3. Fig. 4 is a vertical section of one of the spraying trays. Fig. 5 is a plan with a portion of the rim removed to show the interior of the tray.

A are superposed chambers, each of which is designed to partially wash gas passing through it. The lowermost chamber is mounted upon the chamber B, which is provided with the gas-inlet, and the uppermost chamber having mounted upon it the gas-outlet chamber C. D are the trays, one of which is mounted in each of the chambers A, and all of which are keyed upon the central shaft or spindle E, which is rotatably mounted in bearings top and bottom, and adapted to be rotated by a pulley from any source of power.

Each of the chambers A is provided at its bottom with a central upwardly extending tube or lip F, forming a central connection between the chamber and that immediately below it. Its height above the bottom of the chamber determines the depth of liquid which is normally retained within it, and it also serves as a passage for the gas to be cleansed from chamber to chamber.

Each tray is domed upwards at the centre, and provided at the periphery with perforations; the outer extremity of the periphery being inturned, so as to prevent the liquid being discharged over the edge of the tray. G are scoops depending from the underside of the tray between the domed portion and the perforations.

The outlet chamber C is provided with an upwardly projecting semicircular baffle H around an opening in the bottom of the chamber, which (in addition to serving as an outlet for the gas from the upper chamber) also serves for the introduction of the cleansing liquid through the inlet pipe I. J is the discharge pipe for the liquid—connected to each of the chambers A and to the chamber B by branch pipes K fitted with cocks.

Assuming that each of the chambers A has been supplied with a quantity of liquid, and that the shaft E is rotated, the trays D are caused to revolve, and the scoops G, depending from their lower side, pick up the liquid into which they dip and cause it to pass into the trays D—the scoops also acting as vanes. The centrifugal force generated by the rotation of the trays discharges the liquid through perforations or slots in the peripheries of the trays, so that it finds its way into the chambers in the form of spray, which comes into contact with the upflowing gas, then strikes the walls of the chambers, from which it rebounds, and thereby comes into repeated contact with the gases passed into the apparatus, and rise up successively through the chambers A—their upward flow being assisted by the exhausting action induced by the scoops depending from the trays D.

It will therefore be obvious that the gas which enters the lowermost chamber A passes successively upwards through the complete series of chambers; being subjected to repeated cleansing until it finally issues into the chamber C, and thence escapes in a properly cleansed condition. The washing liquid is run off through the discharge pipe K from the chamber B. Normally, the cocks of the chambers A are shut, and that of the chamber B open—the former cocks being for flushing purposes only.

Production of Water Gas.

SMITH, H. E., of Victoria Street, Westminster.

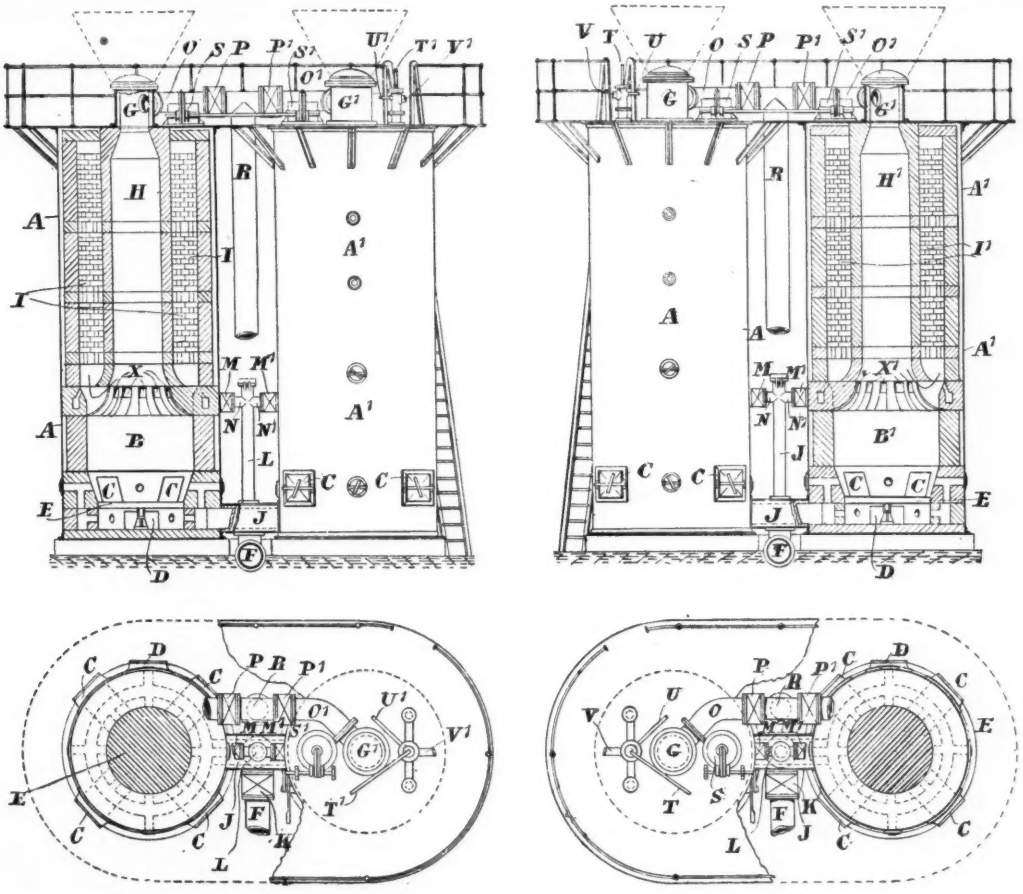
No. 24,893; Nov. 19, 1908.

This invention relates to apparatus for the production of water gas (either blue or carburetted) "in a most economical manner, by securing the utmost heat-efficiency from the fuel consumed in the apparatus." The principle of the arrangement is such that the heat produced during the "blow" is stored in two sets of suitably arranged baffle brickwork, and each of these chambers is used alternately as steam superheater and carburettor—the advantage of the arrangement being that any carbon deposit thrown down from the carburetting material in the carburettor during the "run" is highly heated during the "blow" following, and, in the next "run," the steam passing through in the opposite direction to that of the previous "run" converts the deposit into water gas; thus preventing any accumulation of solid matter in the checker brickwork, in addition to which the connecting and injection pipes are cleansed by the steam in its passage through them. A further feature of the system is the arrangement whereby a stream of gas is made to re-enter at the top of the carburettor, and thus ensure thorough circulation and blending of the gases.

The illustrations represent a part elevation and section, also a portion of the apparatus in plan and a section above the clinkering doors.

Two cylindrical fire-clay lined vessels A A^1 are placed side by side; and in the lower portion of each is formed a water-gas generator B B^1, fitted with clinkering doors C, ash-doors D, fire-bars E, and blast inlet pipe F—connection being made in the centre of the generator crown to charging hoppers G G^1, at the top of the steel vessel, by fire-clay channels H H^1. Above the crown of the generator chambers is arranged a system of checker brickwork I I^1, filling up the space between the charging passages and the outer lining of the shells. This brickwork is arranged so as to ensure uniform heat throughout and long travel of the hot gases, which enter from openings X X^1 formed in the outer circumference of the generator crown, at which points the secondary air supply is admitted. Between, and at the base of, the vessels A A^1, and opening into them, is arranged a fire-clay lined connecting pipe J, provided with a branch on which is fixed the primary-air valve K, and a vertical pipe L is carried up to give the secondary air supply to complete the combustion of the gases coming from the generator chambers B B^1 during the blow. Suitable valves, M M^1, are fixed in the secondary air supply pipes N N^1. At the side of each charging hopper G G^1, a branch O O^1 is formed, provided with valves P P^1, to control the gas-outlet between them and the main outlet T-piece R.

The fuel is fed in from the charging hoppers G G^1 to the full depth of cylinders; and both fires are raised simultaneously to a state of incandescence up to the level of the openings X X^1 leading from the generators B B^1 into the baffle brickwork chambers I I^1, by opening the main blast valve K and the secondary-air valves M M^1. The baffle brickwork chambers I I^1 are highly heated by the complete combustion



Smith's Water-Gas Generators.

of the gases, the products of which escape through the open stack-valves S S^1 at the top of the cylinders A A^1 and directly connected with the baffle brickwork chambers I I^1. When the generators and baffle brickwork chambers have attained a suitable temperature for gas-making, the blast is shut off by closing the valves K, M, and M^1. The two stack valves S S^1 are also closed. One of the gas-valves—say, P^1—is then opened, and steam is admitted through the pipe T to the superheating baffle brickwork chamber I in the other cylinder A, and the carburetting material is admitted by a pipe U^1 to the carburetting baffle brickwork chamber I^1, together with a stream of gas introduced through the pipe V^1, which gas is re-passed from the outlet main or any convenient source. The steam, on admission, travels through the baffle brickwork chamber I, and is highly superheated thereby; while any carbon deposited from previous carburation is converted into water gas, which is carried with the steam to the fire in the generator B, down which they travel—the steam being utilized for the production of water gas according to the usual reaction. The resultant gases now pass through the fire-clay lined connecting pipe J and up through the fire in the generator B^1; the long travel reducing the amount of carbon dioxide present. At the crown of the fire of the generator B^1, the hot water gas comes into contact with the gas generated from the carburetting material together with the circulating stream of gas, both of which have travelled down the carburetting chamber I^1. The resultant carburetted water gas passes away up the connecting chamber H^1 between the feeding hopper and the generator, and through the branch pipe O^1 attached to the side of the charging hopper G^1; thence through the open gas-valve P^1 to the usual condenser and scrubber.

When the test-flame shows indications that the heats are getting low, the oil and circulating gas-valves attached to the pipes U^1 V^1 are closed; the steam supply T is closed; and, finally, the gas-valve P^1 is shut. The stack-valves S S^1 are then opened, and fires are again raised to a suitable state of incandescence by opening the blast-valves K, M, M^1. These valves are then closed, and the stack-valves S S^1 are also closed, and the sequence of operations for the next run is reversed. The gas-valve P is then opened, steam is admitted through the pipe T^1 to the superheating baffle brickwork chamber I^1 in the other vessel A^1, and the carburetting material is admitted by the pipe U to the carburetting baffle brickwork chamber I, together with a stream of gas introduced through the pipe V, which gas re-passes from the outlet main or any convenient source. The steam on admission travels through the baffle brickwork chamber I^1, and is highly superheated thereby; while any carbon deposited from previous carburation is converted into water gas, which is carried with the steam to the fire in the generator B^1, down which they travel—the steam being utilized for the production of water gas as before. The resultant gases now pass through the fire-clay connecting pipe J and up through the fire in the generator B. At the crown of the fire in the generator B, the hot water gas comes into contact with the gas generated from the carburetting material together with the circulating stream of gas, both of which have travelled down the carburetting chamber I; and the

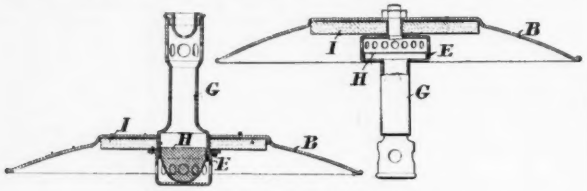
resultant carburetted water gas passes away up the connecting chamber H and through the branch pipe O attached to the side of the charging hopper G; thence through the open valve P to the usual scrubber and condenser. Gas making is continued until a further blow is necessary, when the sequence of operations is again reversed.

Gas-Bracket Radiators.

BRANDT, M., of Berlin.

No. 10; Jan. 1, 1909.

This device is shown as a suspended and as an upright heater. It consists of a mushroom-shaped reflector B made of sheet-metal, with a disc I of refractory material in a cavity in the centre of it. It is fixed to the burner-tube G. In the inverted arrangement, the disc is maintained directly by the burner-head E, which has a wire gauze H in it,



Brandt's Gas-Bracket Heat-Radiators.

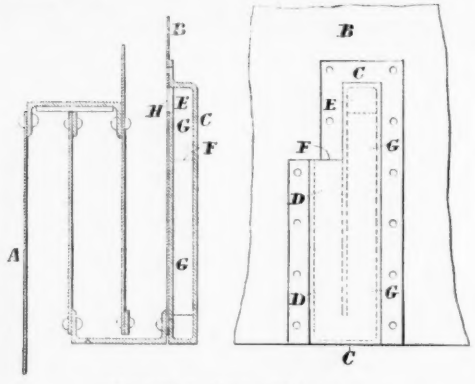
serving to prevent the back-lighting of the flame. The burner-head in the upright type has its tube G fixed upon the air-nozzle. When in use, the flame strikes against the refractory disc I "upon which the hot gases are uniformly divided, to flow off along the inner surface of the reflector."

Gasholder Water Lutes.

WRIGHT, H. F. (C. & W. Walker, Limited), of Donnington, near Newport, Salop.

No. 9485; April 21, 1909.

This invention relates to means whereby water from the lutes or seals of the lifts of gasholders is prevented from passing down the exterior of the lifts and disfiguring them, or causing ice to be formed thereon. It has been proposed to make the rim forming the cup round the edge of the lift and entering the inverted cup around the lift below it below the level of the base of the inverted cup, or else perforated, so as to enable the water in the lute to balance the gas pressure, so that a water-seal is maintained, but, when water is added to the lute, an equivalent amount will be discharged internally over the edge of, or through the perforations in, the rim. This construction requires either an increase of material in the cups or else a reduced seal; and it is the object of the present invention to provide an arrangement by which these objections are overcome.



Wright's Gasholder Water Lute.

The illustration represents, in section, the water-seal portions of two lifts, and an inside view of part of a lift with the improved overflow applied.

The lower lift A and the upper lift B are provided with the usual water-lute cup and inverted cup. To the inner side of the upper lift of any two lifts is affixed a casting or casing C, formed with a longer channel E, and a shorter channel D; these channels being separated by a partition which leaves, at the bottom, a passage forming a communication between the lower ends of the channels. The top of the channel G has an opening in it, above the level at which water is to be retained in the water-seal before cupping, and coincides with an opening in the lift B. The top of the shorter channel D is open (at a lower level than the opening E) at F, to allow overflow water to pass into the tank of the holder.

The German Lamp Taxes.—The taxes on gas and electric lamps have now passed through all their stages, and will come into operation on the 1st of October. The annual yield to the State Treasury is expected to amount to £1,000,000. The introduction of the tax at the date named will result in an increase in prices to the public. Carbon filament lamps up to 15 watts will be sold at 1s. 9·6d. each, compared with 1s. 9d. at present; metallic filament lamps up to 15 watts, which have hitherto been available at 2s. each, will cost 2s. 1·2d.; and incandescent gas-mantles will be sold at 4·2d. apiece instead of 3d.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Mr. Forshaw's Paper on the Luminosity of Gas-Mantles.

SIR,—I have read with very much interest your "JOURNAL" for June 22, containing the report by Mr. Forshaw on the luminosity of gas-mantles, together with the discussion thereon. A later paper of mine, by myself and Traver, on the theory of the incandescent gas-mantle, shows that we believe that the temperature of the mantle is the most important factor in causing its illumination. Our work with commercial gas-burners, however, shows that the illumination follows quite closely the heat-value of the gas.

I am rather compelled to believe, from the fact that the theoretical combustion temperatures of carbon monoxide and hydrogen are so closely the same, that if a mantle and burner could be made which would work with equal efficiency on the two gases, the results would be more nearly the same than are shown in Mr. Forshaw's work.

Chemical Laboratory, University of Michigan, Ann Arbor, July 19, 1909.

ALFRED A. WHITE, Junior Professor of Chemical Engineering.

Discussion on Mr. Waddell's Paper—A Correction.

SIR,—I desire to correct a misreport in your issue of the 3rd inst. You report the writer as having said: "This was an entirely different system from that used at Dunfermline by Mr. Waddell, inasmuch as Mr. Waddell employed continuous high pressure." What I said was: "The system used in Dunfermline by Mr. Waddell differs somewhat from the system used by us in Lochgelly, inasmuch as we carry a much higher continuous pressure."

The high continuous pressure is just what Mr. Waddell tries to avoid, and instead to carry only a pressure equal to the demands of the moment. I think he has achieved this very successfully.

Lochgelly, Aug. 4, 1909. JAMES D. KEILLOR.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bill brought from the Commons, read the first time, and referred to the Examiners: Bury Corporation Bill.

Bills reported, with amendments: Cardiff Corporation Bill, Heywood Corporation Bill, Prestatyn Urban District Council Bill.

Bills read the third time and passed: Gaslight and Coke Company Bill, Heywood Corporation Bill, Llanelly Water Bill, Mountain Ash Urban District Council Bill, Northallerton Water Bill, Oldham Corporation Bill, Prestatyn Urban District Council Bill, Watford Urban District Council Bill.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bill reported, with amendments: Risca Urban District Counci Bill [Lords].

Bills read the third time and passed: Bury Corporation Bill, Stourbridge and District Water Board Bill [Lords].

Large Leakage at Oswaldtwistle.—At the meeting of the Oswaldtwistle District Council last Thursday, the monthly report of the Gas Manager (Mr. J. H. Davies) contained figures showing that during five years the gas sent out from the works for the June quarter has increased by 53 per cent., which is abnormal. Referring to this matter, he said: "My only fear is that a larger percentage of this is going in leakage this year than in previous years, on account of the increased pressure (necessary to supply the consumers, owing to inadequate service-pipes) to be carried on the district."

The Coal Mines (Eight Hours) Act.—In the House of Lords last Thursday, the Lord Chancellor, in answer to a question put by Lord Newton, said it was the intention of the Government to introduce at an early date a small measure to amend the above-named Act. It was designed to meet the difficulties which had arisen under the operation of the original Act with regard to the time of beginning work. It was understood to have the general assent of employers and employed, so far as opinion on the subject had been expressed. It was hoped that, after all, it would prove to be a non-contentious measure, and that it would enjoy a happy passage through both Houses of Parliament.

Electric Light Profits and Losses.—The Lighting Committee of the Tunbridge Wells Corporation reported last week that the borough electricity undertaking, with an outlay of about £80,500 on plant, and working for fourteen years, had produced a clear profit of £59,327 to lessen the burden of rates, and in spite of the competition of gas. On the other hand, it transpired in the course of an inquiry by Mr. H. R. Hooper into an application by the Epsom Urban District Council to the Local Government Board for sanction to a loan of £1500 for electric lighting purposes, that there had been a total loss of £7122, and that the Council had been going on year after year incurring a steady annual loss of £900 with perfect equanimity. Mr. Hooper said there had been a loss on both private and public lighting, and the Council had been carrying on a system of lighting without knowing the cost of it.

THE GASLIGHT AND COKE COMPANY.

The One Hundred and Ninety-Fifth Half-Yearly Ordinary General Meeting of the Proprietors was held last Friday at the Chief Office, Horseferry Road, Westminster—Mr. CORBET WOODALL (the Governor) in the chair.

The SECRETARY (Mr. H. Rayner) having read the notice convening the meeting, and the seal of the Company having been affixed to the register of proprietors, the report (which was given in the "JOURNAL" last week) was taken as read.

A DIRECTORATE LOSS.

The GOVERNOR: Ladies and Gentlemen, I cannot proceed with the ordinary business of the meeting without first referring to the alteration in the constitution of the Board since we last met. Mr. Howard Charles Ward is no longer with us. He was for 45 years a Director of the Company, and during half that period its Deputy-Governor. He was a kindly and courteous gentleman and, as I can speak from grateful recollection of my association with him, a most loyal colleague. He gave of his best to the service of the Company, his connection with which he was proud of. Although he has left us, as I think all of us would like to leave, full of years and held in honourable remembrance, we all on this side of the table are very sorry to lose him. I beg to propose—"That the shareholders assembled here to-day tender to the relatives and the family of the late Mr. Ward their condolence with them, and their appreciation of the services which he rendered to us." [The resolution was carried.]

REPORT AND ACCOUNTS.

Both the report and the accounts are of more than usual interest. The accounts call for, and they deserve, attention in detail, both for what they tell of the past and because of the assistance they afford when considering the future. The most urgent need of the Company, and the aim we all have in view, is to enlarge the demand for gas, and, as a means to this end, to reduce its price. If this policy is to be successful, it should be consistent. Reductions once made must be maintained; there must be no turning back to higher prices, except under circumstances which are plainly irresistible. At the same time, having regard to the moderation of our standard price and to the new condition under which each lowering of price brings, not only gain to the consumers, but additional income to the employees, it is reasonable that the shareholders should receive the full dividend to which they are entitled. On the occasion when I first occupied this chair, three-and-a-half years ago, a remonstrance was made by shareholders against the payment of a dividend of £4 8s. per cent., on the ground that it had not been earned in the half year, and that the financial position of the Company needed strengthening. Since then, the price of our gas has been twice reduced; and we are under promise to lower it again on Jan. 1 next. We have at the same time raised the dividend to £4 10s. 8d.; and we now recommend a further increase to £4 13s. 4d. per cent. These engagements are onerous; but I hope to satisfy you that they have not been rashly undertaken. Now, let us look at the accounts before you. The reduction of price which came into effect at the commencement of the half year, involved a loss in revenue of, in round figures, £40,000. The accounts show not £40,000, but £29,000 only; the difference being due to an increase in the quantity of gas sold, which brought in £11,000. Residual products have realized £406,000, or £93,000 less than in the corresponding period of 1908. Of this great sum, £84,000 is due to the diminished value of coke and breeze. As will be seen from the revenue account, the gross income of the half year has been less by £113,000. On the other hand, the cost of manufacture has been reduced by £99,000, of which £79,000 comes from cheaper coal, and the rest from further savings on working charges. The coal used has been less by 46,000 tons than it was in the corresponding half year; about half (23,000 tons) of this being due to improved carbonizing, and the remainder to a small increase in the percentage of oil gas made. It is a coincidence that the loss on coke almost exactly balances the saving in the cost of coal. I need not refer to any other item in the accounts, except one which appears for the first time—viz., that of £11,605, the contribution for the half year made to the employees under the co-partnership scheme. The balance at the credit of the revenue account is £572,000, or £49,000 less than in the corresponding period. Bringing in the amount carried forward from the last account, and deducting fixed capital charges and the sum specially provided for launching the co-partnership scheme (£27,078), we have available for distribution £773,196, or £7211 more than at this time last year. The Directors recommend a dividend at the rate of £4 13s. 4d., or 2s. 8d. per cent. more than last year. This will require £353,302. Adding £10,000, the contribution for the half year to the redemption fund, we have a total of £363,302. This, deducted from the sum available, leaves a balance to be carried forward of £409,893, or only £2405 less than at June, 1908. If the comparison is made with the balance at Christmas last, the reduction is £13,431. It will be borne in mind by the shareholders that the reduction in price next year will not be accompanied by an increase of dividend. The lowering of the standard price from 3s. 3d. to 3s. 2d. (to which I shall refer later) makes £4 13s. 4d. per cent.—the maximum to which we are entitled when the charge for gas is at 2s. 8d. per 1000 cubic feet. The expenditure on capital account has amounted to £45,213, and has been, as usual, practically all on distributing pipes, meters, and stoves. As the depreciations, coupled with a small sum received for land sold, amount to £47,868, the capital employed shows a slight reduction. The profit of the half year (£572,600) has been sufficient to meet all charges, pay the increased dividend and the statutory contribution to the redemption fund, and leave a margin of £13,500. By the payment of the special bonus of £27,000 to the employees under our co-partnership plan—a payment which is exceptional and will not be repeated—the actual sum carried forward is reduced by about £13,500. Before we meet again, the price of gas will have been, as I have already said, further reduced from 2s. 9d. to 2s. 8d. per 1000 cubic feet, and there will be considerable abatements in the charge for public lighting and in the price in the district south of the Thames. These, together, will further reduce the revenue by about £100,000 per annum. I think, however, that this shrinkage of revenue will be balanced by diminished expenditure, and that there will be little (if any) need to draw upon the large sum of undivided profit which has been accumulated. The cost of coal and oil will be better on the year by a sum considerably larger than we can possibly lose on the price of residuals. I may say that the cost of coal and oil will be at least £100,000 less than if the prices of the past half year had been maintained; and this of itself would balance the reduced price to which I have referred. But we are not yet sure what will be the price of residuals. It will be less than last year; but to what extent we cannot yet say. The reduction in the illuminating power of the gas from 16 to 14 candles which will be effected on the passing of our Act, will bring with it further economies; while the additional gas sold in the West Ham district will be made at less cost and will yield a larger margin of profit. Taking our circumstances as a whole into consideration, we are fully content with our prospects at the lower price.

CO-PARTNERSHIP.

This scheme is now fully launched. More than 8500 employees have been enrolled; and the charge involved has been £38,683. The yearly charge, at the present price of gas, will be about £24,000; and the reduction which is to take effect next January will add to the amount some £4000. When the employees of the West Ham Company are included, the amount will be further increased by from 8 to 10 per cent. Of the large sum appearing in the accounts under this head for the half year, £27,000, is (as I think I have already mentioned) a special bonus not to be repeated. Including this, the average amount at the credit of the members is £4 10s. 11d. There are 1284 officers and men who have received five guineas or over, and will be promptly enrolled as stockholders. We look forward with confidence to the future of this endeavour. We hope that it will tend to perpetuate and improve the good relations already existing between the employees and the Company, and we expect that it will raise the average of zeal and efficiency and tend to eliminate distrust and friction. The affairs of the co-partnership will be managed by a General Committee, representative of all departments of the service; and this Committee will form a link between employers and employed, which will be of great value. The whole gas supply of London—an organization second only to the Railways in respect of the number of men on its pay-sheets—is now based upon the co-partnership principle. I trust our experience may be such as to encourage its further and wide extension.

EDUCATIONAL.

The activity in regard to applications of gas to the service of the community, to which I have made more than one reference, continues. Gas lighting and heating appliances are occupying the attention of inventors as conspicuously and successfully as at any earlier period. Apparatus grows more complex as well as more efficient and popular; and the task of the employees in keeping abreast of this activity, and fitting themselves to apply it in the public interest, more arduous. The system of technical instruction embarked upon three years ago has been of great service to the outdoor staff, and has helped materially to make them capable and trusted advisers to the consumers. Not only are the Directors satisfied, on the evidence furnished by the present year's staff examinations, that the system is bearing good fruit, but the successes of numbers of the staff in the independent City and Guilds of London examinations also prove its merit. The shops which were opened at this station last year for the training of youths direct from the London County Council Schools as gas-fitters have proved successful and nearly self-supporting. The first batch of boys have finished their six months' preparation in the shops, and a second lot of a very promising appearance will enter next week. We are confident that this method of recruiting will be fruitful of good to the Company and to the boys.

THE RETIREMENT OF MR. FOULGER—HIS SUCCESSOR.

Mr. Foulger, who for some twenty years directed the distributing staff of the Company, has, because of the circumstances I referred to six months ago, resigned his appointment; and his resignation, after a total service of 44 years, has been accepted with regret by the Directors. The vacant office has been filled by the appointment of Mr. H. S. Reeson, who had acted as Chief Assistant for eleven years. He is a son of Mr. Joseph Reeson, who was for nearly forty-two years in the service of the Company (a part of the time as Registrar and part as Assistant-Secretary and Registrar), and who retired in 1901. He is a brother to Mr. J. N. Reeson, the very able Engineer-in-Charge of our Beckton works. The new Chief Officer will, we believe, prove all that his training and associations justify us in expecting.

BILL IN PARLIAMENT.

The most interesting event of the half year has been the passing through Parliament of the Act by which the undertaking of the West Ham Gas Company is incorporated with the Gaslight and Coke Company. As the result of negotiations prior to the introduction of the Bill to the Committee, all opposition except that of the West Ham Corporation was withdrawn. The London County Council and the Corporation of the City asked that the standard price should be reduced by 2d., as consideration for their agreement to the reduction of the minimum illuminating power from 16 to 14 candles. This was the price paid by the other Metropolitan Companies for the same alteration; but, as the saving in cost of manufacture could not amount to nearly so much as the authorities named, we compromised for a reduction of 1d. Needless to say, we strove hard against any change; but we preferred to make this sacrifice rather than engage in a strenuous and possibly bitter fight against Municipalities with whom it is our desire, and also the interest of the Company, to maintain friendly relations. We have agreed also that our gas shall in future be tested for its heating as well as its lighting value. So large a proportion of the gas we supply is now used for purposes where heat only is required, that the call for a calorific test is reasonable. The standard of the test is such that we have little fear that under it we shall be called upon for penalties.

THE LABOUR OPPOSITION TO THE BILL.

The opposition to the Bill by the West Ham Corporation was directed largely—I might almost say wholly—to the continuance of the manufacture in West Ham and to the employment of a maximum number of workmen. We gave a pledge early in the negotiations to keep the works at West Ham open for a period of ten years, and to manufacture there substantially the same quantity of gas as prior to the amalgamation. It was desired by the Corporation that we should undertake further to employ the same number of men. One of the chief arguments for the Bill was that the Gaslight and Coke Company can manufacture gas at a lower cost than is possible at West Ham; and the undertaking asked for would, if granted, have nullified this advantage. In other words, we were asked to pledge ourselves to carry on our manufacture extravagantly in order that places might be found for a larger number of men. We have no desire to reduce the number of men. Our effort is, and will be, to increase the output of gas; and to this end it is essential that we reduce the price. To keep up the price is to limit the business; and the workers would feel the injurious effect at least as severely as the investors. No industry and no department of an industry can, without grievous loss, be legislated for on the lines suggested. As an illustration from this Company's experience, the cost of carbonizing has been reduced by the introduction of machinery; but the total number of men employed was greater last Christmas than in the year before. The development of the business in stoves and fittings has involved the employment of a very large contingent of men as fitters, repairers, &c.; and behind these is the much greater number engaged in the manufacture of appliances. Legislative intrusion, such as that sought, would inevitably result in evil and not good to the class which it was intended to benefit; and the voices of the workmen generally—especially those who are co-partners—would certainly be raised against it. The wages and salaries paid by the Gaslight and Coke Company now total to £968,000 per annum; and the conditions of service are in my opinion equal to the very best in London.

THE BILL PASSED.

I am very glad to say that the Bill, with the amendments of the House of Lords, was reported to the House of Commons yesterday and passed; and it now only awaits the Royal Assent. I hope we shall be found working on as good terms with the Corporation of West Ham as is happily the case with us and the other Municipalities of London. With these observations, I beg leave to move—"That this meeting do agree with, and confirm, the report of the Directors and the Auditors' report and statement of the accounts of the Company as transmitted to the proprietors on the 29th ult."

Mr. Ulick J. Burke (Deputy-Governor): I have great pleasure in seconding the motion.

Remarks by Shareholders.

Mr. E. Kimber said, before the motion was put to the meeting, he should like to make a few remarks. He noticed that in No. 14 account the store of coal in hand on June 30 was 83,000 tons. He did not know what was in store on July 31; but it was fair to assume that the same quantity was in store at that date. It was material for the shareholders to know this, because July 31 was a very serious and important date for everyone engaged in the gas industry to consider. July 31 was the date on which a universal coal strike was predicted as being probable in this country. Had the strike taken place, it would have had most disastrous consequences, not only to this Company, but to every other company and all like industries throughout the country. Assuming these 83,000 tons to represent the stock in hand on July 31, 83,000 tons was only just 2 weeks and 4 days' supply for them. It had been calculated that, had a strike taken place, it would have lasted three or four weeks. The result would have been startling, because the Company's stock of coal would have been exhausted; and, as everyone would admit, this would have been a lamentable state of affairs. Now, how could they meet this possibility? He was very glad to see there was one gleam of light shown by the report, and that was that, in addition to the quantity of coal actually employed, 7,723,000 gallons of oil were used.

The Governor: You are wrong as to the 83,000 tons. The quantity of coal in store on June 30 was 119,000 tons.

Mr. Kimber said that was not much more. It only gave them a little over three weeks' supply, instead of 2½ weeks'. But supposing it was 119,000 tons, it was only a proportion of what the Company used in the half year. He noticed that they used 849,875 tons in the six months; and where this quantity would have been obtained had there been a strike, it was impossible to conceive. He thought the time had now come when all gas shareholders should look out for a different source of supply. There was, he knew, another source of supply to be found, and that was in Nova Scotia. It had been stated that coal could be put on board for 5s. 3d. per ton, and brought to this country for 5s. per ton. This would give them coal at 10s. 3d. per ton in the Thames. Coal at present cost them 13s. 8d. per ton, and the South Metropolitan Company 12s. 10d. per ton. This was a difference of only 10d. per ton—a price far beyond the price at which Nova Scotia coal could be delivered here. The quality of the Nova Scotia coal would have to be investigated; but, from all he could ascertain, it was a good gas coal. Although the Company could not investigate the coal, it was high time the shareholders should take up the question for the purpose of serving their own interests. It was absurd for a large body of shareholders throughout the country to lie quiescent when they had, he would not say a thief, but an enemy at their doors, who would, without the slightest compunction, deal out death and destruction to all industry. It was quite clear that the doctrines which had been propagated by Trade Unionists should be laid before a proprietary like that, in order that their true value should be assessed. They were most dangerous to all industrial societies, and some stand should be made against them. Everyone must see that the Trade Unions of this country had got absolute control of extreme politicians; and the sooner this was done away with the better.

Mr. W. A. Hounsom did not think that the meeting should separate without a word being said from their side of the table as to the report and the speech of the Governor to which they had all listened with so much interest. First of all, he would like to endorse the words spoken with regard to the loss of the late Mr. Ward, and his long and honourable connection with the Company. Some of them had been associated with him for many years; and they much appreciated his great abilities. He hoped he might not be out of order in saying that he thought the shareholders would welcome Mr. Godlee, who came in connection with the West Ham Company. He (Mr. Hounsom) had watched the parliamentary struggle the last few months with much interest; and it was a subject of great gratification to him that the result had been so successfully achieved. It seemed the exemplification of the old adage that there was no rose without a thorn. But there was something even deeper than that on which they had to congratulate themselves, more especially the Board and those who surrounded them on the platform; and that was that it was now possible for the Company to so successfully prosecute a Bill in Parliament having such far reaching results as had the West Ham Bill. Going back but a few years, he ventured to say that it would have been impracticable for such a Bill to have become an Act; and it was indeed a happy augury of what they might look forward to in the future. This amalgamation would be of the utmost advantage to the Company and also to the interests of West Ham—all those who consumed gas and all those who made gas. There was one other topic to which he might allude, and that was the new standard of calorific power. He was glad the Company had had to take this matter up, because, although they would be very glad to be free from these standards, tests, and so forth, they must still recognize that, having a monopoly, something of the kind was needful. Perhaps in a few years' time the candle-power test would be a thing of the past. In connection with this, he might say that those who in the olden days turned their attention to the incandescent mantle would see the great progress which had been made in connection with this. The incandescent mantle had for its first object the increase of light. This had the indirect effect of turning attention to the burner; and the effect of the burner and the mantle together had produced the wonderful result they saw to-day. This had led to increased attention being given to the heating power of gas, which had been of the utmost advantage to all parties, because it had given opportunities for the development and the use of gas for heating and industrial purposes. He thought they should give every encouragement to those endeavouring to perfect heating appliances. The sooner they got a good stove suitable for ordinary domestic purposes of to-day, and economical, the better. He was very glad to see that the Technical Journals had taken up the question; and he trusted it might be the good fortune of some of those in that Company, or their employees who were so deeply interested with them as co-partners, or some of those in the chief offices of the Company, to invent a good and efficient stove. Of course, one could not get over the fact that an Englishman did like a poker to knock the coal with to bring a blaze; but if they could satisfy him in another way, he would do without the poker.

Mr. H. H. S. Croft said he thought it ought to be made quite clear that the increased dividend was not at the expense of any provision for the protection of the Company. On looking at the accounts, he noticed that nothing was carried this half year to the insurance fund; and, turning to Account No. 9, he saw that they carried to the insurance fund "interest on the amount invested, £1602." But nothing was put down in the revenue account separately as having been carried to the insurance fund. He did not know whether, under ordinary circumstances, had the increased dividend not been paid, the sum would have been placed to the credit of the insurance fund.

Mr. C. E. Jones said he was reluctant to take up the time of the meeting; but, as they on that side of the table had been somewhat critical, he thought that, as the wheel turned round, the shareholders should have a word of praise for the Board. He had been asked by some friends in the Provinces to express his views on the balance-sheet; and he could only say that it was very satisfactory, very hopeful, and gave great encouragement to them as to the future. He thought the Board should be congratulated for the policy they had pursued in the past; and he hoped it would be continued in the future. As one who had known the late Mr. Ward for over 40 years—having known him at Portsea as well as in the Metropolitan area—he should like to say that he deeply regretted his removal; and the sympathy of those he had left behind was very deep. He felt sure he echoed the sentiment of those on his side of the table when he expressed his hearty sympathy with the Board in the loss they had sustained. He also congratulated Mr. Burke on his appointment; and he hoped that, with his undoubted ability, he would long live to occupy the position he now held. With regard to the coal trade, he said there was a great deal of sentimentality about the winning of coal. The Victorian era was very full of sympathy, but a great deal of it was misplaced. He hoped the sympathy of the Board with coal winners would not lead them into the error of thinking they would get any concessions from Trade Unions. But, where and how were they going to alter the state of things existing to-day when the power of Parliament was wielded through Trades Unions? He knew something about the getting of coal; and there was more danger in the streets of London than there ever was in the coal pits of this country. There was a whole army of men looking after the miner's safety; and the coal mine owners themselves were most anxious for it, and to do their best for their employees. In London alone, there were over 8000 people killed every year, and something like the same number injured; while accidents in mines were few and far between. Directly there was one, however, a wave of sympathy passed over the hearts of the people in this country, who handsomely subscribed to relieve the poor and needy in such circumstances. But, as a matter of fact, most collieries had sick and accident funds of their own. He did not for one moment wish to stem the tide of charity; but he really thought a great deal of it was misapplied. The most important announcement in the report to his mind was paragraph 5; and he heartily congratulated the Board upon the very important acquisition they had recently made to the Company's position. He also congratulated the Chairman of the West Ham Company on having a seat on the other side of the table, with the very excellent Board and their equally excellent staff. From a service point of view, West Ham was a capital place to live in. He remembered in the sixties efforts were made to remove gas industries and others entirely out of London. A great cry went up that they were poisoning the people, that they were monopolists, and ought to be exterminated or banished from this island to the place where "the wicked cease from troubling and the

weary are at rest." Now-a-days, West Ham opposed the removal of the gas-works from their district, because a great change had come o'er the spirit of the dream, and because it had been found that gas companies, like railway companies, were the largest ratepayers. He would not have given an undertaking to remain ten years. But it having been given, he had not the slightest doubt it would be loyally carried out for the benefit of West Ham. For Mr. Foulger's accident, all the shareholders grieved; but they felt that the Board had acted very wisely in appointing Mr. Reeson in his place. He heartily approved the statement of accounts. He wished the Company every prosperity, and congratulated the shareholders on the excellent position that their undertaking was in.

Mr. E. KIMBER said he did not represent capitalists, but simply Trustees of charities who were stockholders in the Company to the extent of £20,000.

REPLY BY THE GOVERNOR.

The GOVERNOR: I have to apologize for a great omission, of which I have been reminded by Mr. Hounsom and Mr. Jones. I omitted to tell you that the vacancy on the Board so sadly made has been filled by the election of Mr. Joseph Lister Godlee, the Chairman of the West Ham Company. This anticipates by a few months an election that would in any case have taken place in January. Under the provisions of the Act just passed, we are required—a condition we willingly accepted—to add a Director of the West Ham Company to this Board; and it has been arranged that the election should be ante-dated. So that Mr. Godlee is with us to-day. We have also been extremely glad that we have been able to bring into the deputy chair one who is so entirely acceptable to the Board as is Mr. Ulick Burke. [Hear, hear.] The interesting observations made to us by the first speaker were a little marred by inaccuracy as to fact; but there is no doubt about the wisdom of seeking other fields from which to supply the great fuel needs of the Company. When Nova Scotia has suitable coal for sale, we shall be glad to hear more of it. Instead of 2½ weeks' supply, we had at the time the shareholder referred to something like seven or eight weeks' supply of coal, as well as other materials for gas making, on the premises; and we are usually able to look forward without anxiety to three months' suspension of supplies. The purchases we have made now extend, as to some portion of our materials, to June, 1911; and they have been made on satisfactory terms. With regard to coal, the savings we shall effect in the current year are large. The position of the Company is one of security with regard to a strike of any probable duration. We are always pleased to hear Mr. Hounsom upon the affairs of the Company; and we are glad indeed to have his approval of the terms of the Bill which will shortly become an Act. The result of it will be a widening of the sphere of our operations by bringing in an area in which there is a much greater prospect of increase than there is in the built-up area of London. This will add materially to our own success by bringing into profitable use plant now lying idle, and it will advantage the consumers by saving the expenditure of a very large sum of money, which would have meant simply duplication and waste. With regard to the insurance fund, we have not carried anything to the fund this half year. We are quite satisfied with the amount standing to the credit of the fund at the present time. Last June, we put £10,000 to it, mainly because it had been depleted to a certain extent by an exceptional and a regretted explosion which led to considerable expense. I can hardly allow the observations with regard to Trade Unions to pass as expressing the view of the shareholders of this Company. There is no doubt whatever that Unions of employees have been to their advantage in many respects. Of course, we all deplore the uses that have been made of these organizations in some cases; but the union of men in all trades for the protection of their own interests is, I think, one that is desirable in the common interest. I am always glad to see a Trade Union well managed and conducted, as I think it is a security for peace.

The resolution was put to the meeting and carried unanimously.

DIVIDENDS.

The SECRETARY then read the minute of the Court of Directors as to the dividends, viz.:—

Resolved, that it be recommended to the half-yearly ordinary general meeting of proprietors to be held on the 6th prox.:
(1) That the sum of £10,000 be set aside out of the divisible profits of the Company for the half year ending on the 30th day of June last towards the redemption fund, in accordance with the provisions of the Company's Act of 1903, and
(2) That a dividend as follows for such half year be declared, subject to deduction of income-tax—
On the 4 per cent. consolidated preference stock at the rate of £4 per cent. per annum,
On the convertible 5 per cent. preference stock at the rate of £5 per cent. per annum,
On the 3½ per cent. maximum stock at the rate of £3 10s. per cent. per annum,
On the ordinary stock at the rate of £4 13s. 4d. per cent. per annum.

The GOVERNOR: I move the adoption of these recommendations.
Mr. JONES seconded the motion; and it was carried unanimously.

VOTES OF THANKS.

Mr. R. J. N. NEVILLE proposed a very hearty vote of thanks to the Governor, the Deputy-Governor, and his colleagues on the Board for all they had done for the shareholders. He did not think anyone who had followed the progress of the Company for the last ten years could possibly have believed that within that time they would have been in the position they now occupied. Those who had passed through the dark and troublous years when they were in Parliament, and when every Municipality was up in arms against them, if they compared those years with the present, would see, as the Governor had told them, that the Municipalities had been conciliated, the price of gas had been reduced, the dividends had gone up, and co-partnership had been carried through successfully. And not only this, but £100,000 of capital unrepresented by plant had been redeemed out of dividends; and this process was going on. He felt sure there was not a shareholder who did not feel that he owed a great debt of gratitude to the Board and their officials. They had the best possible hopes for the future that the Board would live up to what they had done in the past. As it was said, everything came to those who waited; and he thought the shareholders would see that the position of the Company in the near future would be strengthened. There was not the slightest doubt that there was an enormous future for gas undertakings in this kingdom, if they could only get people to take an interest in them; and, if there was any one who could push forward and advance the progress of the Company, he was perfectly sure it was the Directors and the officials who stood behind them. He felt sure the proprietors had absolute confidence in the Board, and also that the Board would do even more for the proprietors in the future than they had done in the past.

Mr. J. REESON, in seconding the proposition, said he felt great pleasure, when looking back at the troublous times, in knowing that a forward policy was being adopted, which he was sure would be successful.

The motion was carried unanimously.

The GOVERNOR: Ladies and gentlemen, we are all pleased to see so many ladies gracing our meeting; and I am sure that we are all very much obliged to you for the vote you have just passed. I am glad that reference has been made to the satisfactory passing of the Bill by reason of the non-opposition of the Municipalities of London. I am sure that in the story of the past few years there is nothing more gratifying than the altered relations of the Company with both its consumers and the local authorities. We were prepared to go a little further than we otherwise might have gone to fully maintain these amicable relations. I am also glad that Mr. Neville included in the vote of thanks the officers of the Company. I will not add anything to what he has so well said, except to say that we appreciate very highly the services rendered by our staff, and we are proud of the men we see around us.

WEST HAM GAS COMPANY.

Half-Yearly Report and Accounts.

In the report for the six months ending the 30th of June which the Directors of the Company will present at the general meeting to be held to-day, they say it will in all probability be the last ordinary half-yearly report they will present to the stockholders; but they intend summoning a special meeting in December to receive a final report of their actions in connection with the Company's affairs.

The accounts accompanying the report show that the sale of gas produced £121,159; the rental of meters, stoves, and fittings, £18,840; residuals brought in £24,828; and the total revenue was £164,864, compared with £160,071 in the first half of 1908. The manufacture of gas cost £83,355 (coal, coke, breeze, and oil figuring for £56,928, and repairs and maintenance of works for £14,865); distribution entailed an expenditure of £31,181; management cost £5670; the total expenses were £129,587, against £124,230. The balance carried to the net revenue account is £35,277, compared with £35,841; and the amount available for distribution is £52,045 (of which £21,455 has been brought forward), against £51,234. The Directors recommend that dividends at the rates of £5 and £5 7s. 6d. per cent. per annum be paid on the preference and consolidated ordinary stocks respectively for the half year. These will amount to £29,326, and leave £22,719 to be carried forward. The last dividend on the ordinary stock was at the rate of 5¼ per cent.; but the price of gas having been reduced by 1d. per 1000 cubic feet last Michaelmas, the proprietors are entitled to the additional dividend of 2s. 6d. per cent. per annum. The Directors remark that the fact that the profit balance of the past six months (£30,590) has by itself provided the dividends recommended and left a sum of £1264 to be added to the previous carry-forward, will, they believe, be considered very satisfactory. At the date of the report (July 27), the Bill to sanction the amalgamation of the Company with the Gaslight and Coke Company had been passed by the Committee of the House of Lords and ordered to be reported for third reading. This stage was successfully passed last Wednesday.

Statements relating to manufacture show that 49,958 tons of coal, 160 tons of cannel, 842,341 gallons of oil, 7551 tons of coke, and 2137 tons of breeze were used in the production of 963,275,000 cubic feet of coal and water gas, of which 855,834,000 cubic feet were sold and 924,419,000 cubic feet accounted for. The residuals produced in the half year were: Coke, 30,309 tons; breeze, 7197 tons; tar, 749,991 gallons; sulphate of ammonia, 653 tons.

Methane-Hydrogen Plant for the St. Mary Church Gas-Works.—At the meeting of the Torquay Town Council last Tuesday, Mr. Foster submitted a recommendation by the Gas Committee that there should be an installation of methane-hydrogen gas-plant at the St. Mary Church Gas-Works, at an estimated cost of £1200. He said this would have the effect of saving upwards of £700 a year; and it was hoped that at a future date the Committee would be able to still further reduce the price of gas.

Gas Poisoning at Newcastle-under-Lyme.—At the Newcastle-under-Lyme Police Court last Wednesday, Edward Botham, aged 55, a collier, was charged on suspicion with having caused the death of Elizabeth Botham between the previous Monday evening and Tuesday morning. The woman was found asphyxiated, and her husband, Thomas Botham (brother of the accused), unconscious; the house being full of gas, which was escaping from a severed pipe downstairs. The only people who spent the night in the house were Mrs. Botham, her husband, and the accused. The Chief Constable stated that the gas-pipe leading from the main to the meter had been hacked through with a hatchet [produced], which bore traces of lead on it. Thomas Botham, who was removed to the Workhouse Infirmary, had recovered consciousness. Ethel Botham, daughter of the deceased, gave evidence of the discovery of the tragedy. The Chief Constable applied for a remand, and the accused was admitted to bail on his own recognizances. An inquest was opened later in the day and adjourned.

SOUTH SUBURBAN GAS COMPANY.

The Half-Yearly Meeting of the Company was held last Friday, at De Keyser's Hotel, Victoria Embankment, E.C.—Mr. CHARLES HUNT in the chair.

The SECRETARY (Mr. Charles M. Ohren) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN, in moving their adoption, said his opening observation must be a personal one. The first paragraph of the report mentioned the decision of Mr. Morton not to continue the chairmanship. Much as the Board regretted this decision, they had no alternative but to bow to it. Mr. Morton was one of the veterans of the gas industry, and had fully earned a right to a position of comparative rest. His colleagues hoped, however—and he (the Chairman) was sure the proprietors did also—that Mr. Morton might be long spared to give the Company, as a member of the Board, the great benefit of his sound judgment and ripe and wide experience in all matters relating to gas supply.

THE GENERAL RESULT.

The accounts showed that sufficient profit had been made during the half year to enable the sum of £4500 to be placed to the credit of the insurance fund, which brought it up to within something like £1000 of the statutory amount. After providing for the payment of the full dividend authorized under the provisions of the sliding-scale, the balance to be carried forward would be about £600 in excess of that brought forward from the previous half year. This result was the more gratifying because the advantage gained in lower prices for coal had been more than counterbalanced by the lower returns from residuals—the price of coke in particular having been very much reduced. There were, however, indications that the bottom had been reached in this regard. But taking the accounts as they stood, and putting on the one side the saving in the cost of coal, and on the other side the loss on residuals, there was an adverse balance of upwards of £1700.

THE MODERN METHOD OF OPERATING RETORTS.

Fortunately, however, there had come to the rescue, what was referred to in the report as "a notable advance in carbonizing methods." He felt sure the proprietors would not be disposed to find fault with this description of methods by which, as compared with the corresponding half of last year, there had been a saving of no less than 4800 tons of coal, notwithstanding an increase in the output of gas of over 16 million cubic feet, which represented another 1400 to 1500 tons of coal saved. In other words, there had been an actual increase in the quantity of gas sold per ton of coal carbonized of upwards of 1000 cubic feet. He was certain the proprietors would agree that such a result as this reflected the highest credit upon their Engineer (Mr. Shoubridge) and upon all who were associated with him in the carbonizing department. He might say that the result had been brought about mainly by the adoption of what might be called the modern method of operating retorts from one end only, instead of from both ends simultaneously, as was formerly almost the universal practice, and by means of a system of machinery which enabled the weight of coal put into the retorts to be almost indefinitely increased. This had resulted in a great saving in the cost of handling both the coal and the coke. And, at the same time, by increasing the intervals between the charges so as to allow a longer period of carbonization, it was found that the yield of gas was much greater than was possible by the ordinary system of smaller charges at shorter intervals. Carbonization, he might say, was receiving just now more than the usual amount of attention, owing to the introduction of new processes which had for their object the supersession of the horizontal and inclined systems. These were receiving the careful attention of their Engineer, with the view of the adoption of one or other of them should this be found desirable. Of one of these processes it was recently said by a very eminent German Gas Engineer, that the result showed "an advance along the whole front of carbonization." This was a result by which any system of carbonization must ultimately be judged. They might not have attained to this with the horizontal retorts; and it might not be possible to do so. At the same time, the recent experience seemed to show that the capabilities of the horizontal retort had not yet been exhausted.

THE 14-CANDLE STANDARD AND THE CALORIFIC POWER TEST.

Among other advantages that had been derived from this change of method, it might be mentioned that it had definitely solved the somewhat vexed problem of how to make from coal 14-candle gas; the average illuminating power during the past half year having been about 14½ candles. They were, therefore, now practically working down to the standard first prescribed by Parliament in the case of the South Metropolitan Company's Act of 1900, and which had been practically adhered to by Parliament ever since. There could, however, be no such thing as finality about 14-candle gas. When Sir George Livesey was before the Parliamentary Committee in 1900, he was asked by the Chairman—Sir George having made out such an excellent case for the reduction of the illuminating quality—why he did not ask for more than a 2-candle reduction; and when the South Suburban Bill of 1903 or 1904 was before Parliament for a reduction to (he thought it was at that time) 13 candles, the Chairman of the House of Commons Committee expressed the opinion that it would be a good thing for the public if gas companies could see their way to supply gas as low as 8 candles. From this was seen the feeling of the Legislature with regard to this matter; and it was seen also that it was their own carbonizing methods that had been lagging. The time, however, was probably not far distant when they would be in a position to ask either for a further reduction of the standard of illuminating power, or, what would perhaps be better, the abolition of the illuminating power test and the substitution of one for calorific value only. The importance of illuminating power as such was now mainly confined to flat-flame gas-burners, the use of which was disappearing. In the present session of Parliament, a calorific power test had been submitted to by the Gaslight and Coke Company; and, although as an addition to the ordinary illuminating power test this was not a precedent to be followed, and although, also, its imposition was by consent of the Company under somewhat special circumstances, and as subject to revision by the Board of Trade at the end of three years—it nevertheless marked an era, and might probably be regarded as the first step towards the abolition of the illuminating power test. In fact, Dr. Frank Clowes, the eminent Chief Chemist to the London County Council, in a recent article on the subject in "The Times" Engineering Supplement, while stating that "there is still a sufficient number of flat-flame burners in use to make the illuminating power of the gas, at least for a time, of importance," went on to say: "Possibly at no distant period, the illuminating power test may lose even the restricted importance which it at present possesses." This from the standpoint of the writer of the article seemed a perfectly fair view to take; and though they might think that Dr. Clowes attached somewhat too much importance to the flat-flame burner, they, at all events, saw where gas suppliers were, and what it was that was likely to stand in the way of further progress. Some time ago, it was remarked of one of the most important cities of Europe that such a thing as a flat-flame burner was not to be found in it. He (the Chairman) wondered how long it would be before the same thing could be said of any town or city in the United Kingdom.

CONSUMPTION INCREASES UNDER ADVERSE CIRCUMSTANCES.

There had been an increase in the quantity of gas sold—not a large one it was true, but a distinctly encouraging one under the circumstances. Depression of trade had made its mark in the Company's district in a larger number of empty houses than had been known for many years. Consumers were also practising economy by the substitution of inverted for upright incandescent burners, by which they were enabled to save in consumption 10 to 15 or even 20 per cent.; and the Directors were doing their best to encourage the use of these burners, and also the use of any gas apparatus of proved economy, in the belief that advantage to the consumers meant, in the long run, advantage to the Company. On the other hand, gas-fires were increasing in popularity, and had no doubt, during the inclement weather of last spring, contributed to the increase of consumption. Their aim was to assist consumers in every possible way, so as to extend the use of gas for all purposes. The Company's show-rooms, of which there were three in various parts of the district, in addition to the one at the works, were being made use of by the consumers to an increasing extent. Steps were also being taken to strengthen the outdoor, or what might be more properly termed the sales, department of the business, so as to bring this into touch with consumers in all parts of the district, however remote.

PUBLIC LIGHTING BY INVERTED LAMPS.

It might interest the proprietors to know that the alteration of the Beckenham public lamps, to which reference was made by the Chairman at the last meeting, had now been completed; and the new inverted burners were giving general satisfaction—the "greater brilliancy" of the "improved lighting" having been remarked upon in the Local Press. It might be remembered that this system of inverted burners was devised by a member of the Board—Mr. Charles Carpenter, the Chairman of the South Metropolitan Gas Company. Independent testimony to the great value of inverted burners for public lighting, and at the same time to the superiority of gas over electric lighting for the same purpose, had recently been borne by a Committee appointed by the Corporation of the City of London to inquire into the various systems of public lighting. The Committee made a tour of all the principal cities in Europe, and their inquiry was an exhaustive one. In their report, which had just been published, they recommended "that high-pressure incandescent gas-lamps, with inverted burners, should be adopted as the illuminant;" and they went on to say that, where gas was impracticable, there the electric light should be adopted.

REDUCTION IN PRICE.

It was a great satisfaction to the Directors that they had been enabled, owing to having obtained a further small reduction of the price of coal, to announce another reduction of 1d. in the price of gas; bringing it down to 2s. 5d., which was the lowest price ever charged by the Company. This reduction represented a saving to the consumers of about £5600 per annum, and would entitle the proprietors to an increased dividend of 3s. 4d. per cent. (which there was every reason to believe they would be in a position to pay), as also the additional bonus which would accrue to the co-partners. With regard to dividends, it would be remembered that, by their Act of 1905, the neutral zone extending from 2s. 10d. to 3s. 2d. per 1000 cubic feet (within which there could be no alteration of dividend consequent upon any alteration in the price of gas) was abolished; and the standard price was reduced from 2s. 10d. to 2s. 9d. At the same time, the variation of dividend for every 1d. alteration in the price of gas was increased from 2s. 6d. to 3s. 4d. per cent.; and to the extent of this increase, there was now a stronger inducement than before to reduce the price of gas. As a matter of course, the Company made no pretence of working for nothing; and he had no doubt that any increase of dividend the Directors might be able to give would be acceptable to the proprietors. He could, however, say with all sincerity that, quite apart from any question of increase of dividend, the Board were most desirous of maintaining the honourable tradition of Sir George Livesey's policy, of selling gas cheaply.

NEW EMPLOYEE-DIRECTOR.

The last paragraph of the report had reference to the election of Mr. George Ross as Employee-Director in succession to Mr. Robert Wyllie, who had retired from the service of the Company. He (the Chairman) had much pleasure in repeating what was stated in the report—viz., that Mr. Ross had already proved to be a useful Director, and, he might add, one with whom it was a great pleasure to work. The Directors attached great value to this system of Employee-Directors, because, among other advantages, it formed a connecting link between the Board and the Company's employees, and, as he took the opportunity of saying at the co-partners' dinner the previous week, it helped to create between them mutual confidence and sympathy. He would conclude by saying that the co-partnership system continued to be what it had been from the commencement—an emphatic influence for good to all concerned. The amount of stock held by the co-partners and on deposit was nearly £35,000, exclusive of the bonus now payable. This exceeded the total bonuses paid by fully £1000, notwithstanding

withdrawals to the extent of about £17,000 for investment in other property, and on men withdrawing from the Company's service. He (the Chairman) was sure the proprietors would agree that these figures were very satisfactory.

Mr. ROBERT MORTON seconded the motion; and it was unanimously carried.

The DEPUTY-CHAIRMAN (Mr. Jabez Light) moved the declaration of a dividend for the half year of 5 per cent. on the preference stock, and 5½ per cent. on the ordinary stock, less income-tax. He observed that he was sure the resolution would be received unanimously. Following the last reduction in price, there had been an increase of 3s. 4d. per cent. in dividend to the proprietors, and to this had been added an extra bonus to the co-partners. Beyond this, there was the reduction of 1d. per 1000 cubic feet in the current half year. In his view, this was a case illustrating that nothing succeeded like success.

Mr. GEORGE ROSS said it gave him great pleasure to second the motion. While doing this, he desired to thank the Chairman for the favourable remarks he had made concerning him (Mr. Ross). He did not know that he altogether deserved it. Indirectly, he had a share in the work that made for the prosperity of the Company. It was a small share indeed. But being a co-partner, and a great advocate of the co-partnership system, it happened to be his duty to see that the wheels went round; and all the time the wheels went round Mr. Shoubridge, their respected Engineer, was well satisfied.

The motion was unanimously adopted.

Mr. HAROLD GUNDRY moved a vote of thanks to the Chairman, Directors, the officers, and the whole staff. He praised the careful and skilful handling the business received; and remarked that, in spite of the keen competition of the electric light and the formidable oil-lamp, they found themselves on the tide of success; enjoying a satisfactory dividend. The proprietors fully appreciated the results that they saw in the report and accounts. They, however, deeply regretted that Mr. Morton had thought fit to retire from the chairmanship; but, on the other hand, they were consoled by feeling that he had such a worthy successor. They were glad to know the chairmanship was in strong and able hands. The proprietors also welcomed warmly the appointment of Mr. Ross to the Board.

Mr. G. READ CLARKE seconded the motion; and it was heartily agreed to.

The CHAIRMAN, having responded for himself and his colleagues, endorsed the remarks that had been made regarding the officers and the staff.

Mr. S. Y. SHOUBRIDGE, acknowledging the vote on behalf of himself and his staff and workmen, said it was very gratifying to them to know that the results of the operations of the half year had been so satisfactory. They proved, he thought, conclusively, not only the advantage of the adoption of the new carbonizing methods, but also the fact that the principles of the co-partnership system had been very thoroughly taken to heart by the employees. He could testify that they had all done their utmost to promote the success of the Company.

Mr. OHREN also replied, and assured the proprietors that all in his department were striving their very utmost to carry on their duties as true co-partners.

The Illumination of Small Towns.

The following was among the "Notes on Gas Lighting" in the "Ironmonger" last Saturday: "Our contemporary the 'Revue des Eclairages' can scarcely be accused of partisanship in regard to the relative merits of gas and electric lighting; and the account by Herr Wurdemann of the cost of illuminating the towns of Bentheim and Anhaus, in Hanover, which it reprints, will be read with considerable interest. Bentheim, with 4300 inhabitants dwelling in 865 houses, has adopted electricity; Anhaus, in whose 900 houses 4599 people reside, uses gas. With respect to the public lighting, Bentheim has 119 incandescent electric lights, which give 6,000,000 Hefner units in 2000 hours per annum, while Anhaus has 110 gas-lamps which, though only lighted during 1600 hours, give 13,500,000 Hefner units. As to the expense, Bentheim pays £350 and Anhaus about £113 for its lighting. On coming to the lighting of the interior of the houses, while 25 per cent. of the houses in Anhaus have gas supply, electricity is only supplied to 18·8 per cent. of the houses in Bentheim; and in addition 1·8 per cent. of the inhabitants have taken gas for cooking purposes. In Bentheim electricity costs 50 pf. (6·2d.) per kilowatt for lighting, and 20 pf. (2·4d.) for power; gas at Anhaus being 16 pf. (2d.) per cubic metre for lighting and 12 pf. (1½d.) for heating. While the Anhaus Gas-Works are making a small profit of about £215 per annum, the Bentheim undertaking has lost £1100 on the year's working. The figures are interesting, for they show plainly the bad financial results which often follow the introduction of electric lighting in small towns, though, of course, where plenty of water power is available, as in the Black Forest and Switzerland, electricity is the obvious source from which to obtain illumination, whether public or private."

Lincoln Gas Undertaking.—The net profit on the gas undertaking of the Lincoln Corporation for the past financial year amounted to £5169, compared with £4562 for the preceding year; the difference being mainly accounted for by an increase of £1239 in the amount received for gas sold. The balance standing to the credit of the gas account in March was £1903, after £3000 had been granted in aid of the rates. The Gas Engineer and Manager (Mr. John Carter) says that last year was the most successful the department had had; the make of gas exceeding that of the previous year by 13½ million cubic feet.

Buenos Ayres Gas Amalgamation.—It has been officially notified by the Primitiva Gas and Electric Lighting Company of Buenos Ayres, Limited, the Buenos Ayres (New) Gas Company, Limited, and the River Plate Gas Company, Limited, that an *ad referendum* agreement with the Municipality of the City of Buenos Ayres was passed by the Municipal Council on the 30th ult. This agreement, it may be remembered, covers an amalgamation of the three Gas Companies of Buenos Ayres. Meetings of the shareholders of the Companies will be called in due course to consider the acceptance or otherwise of the agreement.

TOTTENHAM AND EDMONTON GAS COMPANY.

The Ordinary General Meeting of the Company was held last Saturday, at the Gas-Works, Willoughby Lane, Tottenham—Mr. CORBET WOODALL in the chair.

The SECRETARY (Mr. E. Topley) read the notice calling the meeting; and the Directors' report and the accounts were taken as read.

THE NEW ORDER OF THINGS.

The CHAIRMAN said that he did not propose to detain the proprietors at any length in moving the adoption of the report and accounts. They met once a year now, it had become the custom, at the gas-works, in order that they might see the property, understand a little as to the work that was being carried on there, and satisfy themselves that the money subscribed had something that worthily represented it in the shape of buildings and plant. He might say it was always a pleasure to meet the proprietors of the Company, especially when they had a good balance-sheet to present; and, as they never had a bad one, perhaps the qualification was unnecessary. This was the fifty-first half-yearly meeting held since he (the Chairman) became a Director; and it was the twentieth over which, with one exception, he had presided as Chairman; and during this long period the story of the Company had been one of growing and almost uninterrupted prosperity. To-day the statement the Directors offered to the proprietors was worthy to rank with the very best they had ever had. He was especially glad this was so, because, as they were all aware, they had completed the first year of their experience under the new order of things by which practically everyone of their employees had been made a partner in the undertaking, and had been given an added incentive to strenuous effort in its service. The start had been a good one; and if later on they fell away from the good standard that had been established, the Directors would be at liberty to say to the new co-partners, Why is this?

A BUOYANT BUSINESS.

His friend the Deputy-Chairman, who at very short notice was good enough to take his place at the last half-yearly meeting, made some observations as to the difficulty in an undertaking growing at the rate at which this one was doing, of living up to a high percentage of increased output—that was to say, it was one thing to have an increase upon a business of 20 millions; it was quite a different thing to have the same rate of increase on a business of ten or twenty times the amount. Five per cent. upon their business ten years ago meant 25 million cubic feet; 5 per cent. on their business to-day meant 69 million cubic feet. He had occasionally felt anxiety on the same score, especially when considering with Mr. Broadberry the scale on which extensions of works should be designed. Still the progress was maintained; the growth of their output was as buoyant as ever; and so far as he could see, this state of things would continue, if they maintained the policy of the past—watching carefully their expenditure, but never grudging what was necessary in order to ensure the most efficient and economical results. The increase in the sales of gas in the past half year had been 8¼ per cent. over 1908, although that half year had an increase of 10¼ per cent. over the corresponding half of 1907. This 8¼ per cent. meant in gas made about 60 million cubic feet. The direction development was taking was shown by the fact that, while they had sent out more ordinary meters by 4·8 per cent., or nearly 5 per cent., the increase in the prepayment meters had been over 17 per cent.; and while the extra gas supplied through the ordinary meters had amounted to 20 million cubic feet, the extra gas supplied through prepayment meters was 36 million cubic feet. This increase was due not only to the growth in the number of consumers, but also to the amount consumed by each individual consumer. This had arisen by reason of the fact that the Company were now allowing the prepayment consumers to have stoves free of rent. The result had been that the average consumption per consumer, which was in 1907 6474 cubic feet, and in 1908 6832 cubic feet, had been for the past half year 7162 cubic feet. This meant over 14,000 cubic feet per consumer per annum, which was very satisfactory.

PUBLIC LIGHTING.

There had been a falling off in the demand for public lighting, because certain of the main roads in Tottenham were now served by electric lamps. The net loss in the number of lamps was 94. The Directors regretted this for the sake of the revenue lost, and also he might say because they felt so strongly that the change was unnecessary. They were quite satisfied the Company could give much better service for less money. In this respect, Tottenham (which they regarded as a town in the van of progress) had dropped a little behind. He was glad to report that a contract had been entered into with Edmonton for a period of ten years for the supply of gas to the public lamps. Most of the public lamps in the Company's district were now lighted and extinguished automatically. A considerable saving in the cost had thereby been secured. He thought it was palpable to anybody that there was a great waste in hand lighting. The men were occupied for at least an hour going round to light the lamps, so that the last one was alight before sunset; and they had to put in an hour's work in the early morning to extinguish them. Now that the lamps were automatically lighted and extinguished respectively night and morning practically simultaneously, there was a considerable saving; and a further advantage to the men was that they had not to turn out at an unconscionable hour, no matter how inclement the weather, for the purpose of extinguishing the lamps.

UNACCOUNTED-FOR GAS.

Complaint was made at the last meeting that the percentage of unaccounted-for gas was high. He remarked at the time that they must wait for a whole year's record before they came to the conclusion whether or not it was high. For the past half year, they found, instead of it being something like 7 per cent. it was 1·67 per cent. He was sure the 1·67 per cent. was as wrong as was the 7 per cent.—at any rate, the average was a perfectly good one. He was bound to admit he did not understand the year's record at all; and they must be content to accept the satisfactory fact.

CAPITAL ACCOUNT.

Turning to the accounts, they found the capital expended during the half year was £16,554, or at the rate of £300 per million upon the amount of the additional gas sold. Over the whole output, the capital now represented £440 per million cubic feet—a rate upon which the Company might well be congratulated. The subscribed capital was over-spent by £26,100; and so long as they could borrow money at the rates obtaining at the present time, the Directors had no intention of issuing further stock or debentures, in order that they might have a balance in hand. They would not need to call for additional capital, at any rate, before the spring of next year.

REVENUE ACCOUNT.

The revenue for gas showed an increase of £4500, although the price charged was 1d. per 1000 cubic feet less than last year. Residuals were only down by about £300; and the total receipts for gas, rents, and residuals were more by £6000. They had used 2635 tons of coal and 70,000 gallons of oil more respectively than in 1908, and although these materials were bought at lower prices (coal cost an average of 8d. per ton less than in 1908) the extra cost amounted to £1176. Upon repairs of works, they had spent more by £3000; and one other item of special interest was the charge of £624 extra for rates. This apparent increase was not a real one. A year ago the Company were contesting the rates with the authorities. For that reason, they did not then pay the whole of the rates due; and these had been paid up in the past half year. He might mention that carbonizing wages were at the lowest level they had yet attained. The use of machines had brought about this result, while the wages of the men had been fully maintained, and their labour made less exhausting.

CO-PARTNERSHIP SCHEME.

The only other item calling for special notice was the co-partnership bonus of £1300. For the past twelve months, the contribution to co-partners out of the funds would be £2300; and if they added the special sum advanced to start the scheme—the so-called "nest egg"—the total amount distributed in the year was £6272. This was a very large sum; and might be taken, in some measure, as an indication of the seriousness with which the Directors regarded the new departure. While they were unfeignedly glad to know that the new system opened a better prospect to the employees and their families, the Directors would have no right to devote the funds of the Company for this purpose only. The scheme was not one of philanthropy. It embodied a business transaction; and the Directors believed it would be profitable to both parties. They expected that the head, and to some extent the heart also, of the employees would be brought to aid their hands; and that intelligent effort would bring further prosperity to the Company. Might he urge upon the co-partners how desirable it was that their investment with the Company should grow; and therefore they should aim at leaving all bonuses in, and not a half only, for that purpose?

GENERAL RESULT.

The general result of the working was that, after providing the £1300 to which he had referred, and in face of a charge of 1d. per 1000 cubic feet less for gas, which represented £3000, they had as net profit £2000 more than in the corresponding half of last year. For the immediate future, he was glad to report that their purchases of coal and oil had been made at lower prices, and that, consequently, the prospect of increased profit was good. He should be surprised if shareholders, consumers, and co partners were not rejoicing together at the meeting a year hence on a lower price of gas, a better divided, and an increased bonus. He concluded by formally moving the adoption of the report and accounts.

The DEPUTY-CHAIRMAN (Sir Daniel F. Goddard, M.P.), in seconding the motion, said there was only one observation of the Chairman's to which he would allude. He said, at the beginning of his remarks, that it was always a pleasure to meet the proprietors of the Company. He (Sir Daniel) thought the proprietors would rejoin that it was always a pleasure for them to meet the Chairman. They were all—Directors and proprietors generally—very glad indeed that Mr. Woodall had been restored to health, and able to take his wonted place, and make his speech on the present occasion. This had done more to enlighten the proprietors on the affairs of the Company than any other speech could possibly have done.

Mr. MOORE inquired whether the co-partnership scheme was going forward satisfactorily.

Mr. E. R. CASS, speaking as a co-partner, said he and his fellow employees desired to thank the Board for having introduced the system of co-partnership, which had entitled them to attend the meeting, feeling that they had an interest in the Company now beyond the weekly wage, which, up to recently, had been their only reward. They now felt they had an opportunity of saving money which otherwise they would not have had; and they were indeed proud of being co-partners in the Company. The trust the Directors had put in the employees, they would do their best to justify by furthering the interests of the Company.

The CHAIRMAN said he believed Mr. Cass had voiced the sentiments of his fellows in the service; and as he had pledged himself in their name that the best should be done by them to make co-partnership a success, he, on behalf of the Directors, could only repeat the pledge already given, that they would do the same in so far as it was in their power. Mr. Moore had asked a question as to whether the scheme had, up to now, been an unqualified success. As the question had been asked, he would read a few lines from a letter which Mr. Broadberry wrote to him the previous week:

> I am glad to say that many of the men do already realize the advantages, and work with more thought and goodwill, and less waste of time and materials, than formerly. There are others who do not yet seem to have realized that thought and attention to these matters are of any advantage to them personally. But, as the years go on, the appreciation will no doubt sink into their minds to the same extent as it has done into those that grasp it more readily. On the other hand, I am sorry to say that, in one or two cases, we have come across men who are so hopelessly unthrifty that, as soon as they obtained the knowledge that the nest-egg bonus allotted to them was their own property, they were anxious to sell it, even at the risk, and with the full knowledge that, if they did so, they would be considered not only unworthy to continue as co-partners, but also that they were unworthy to be continued in the same employment as co-partners.

That was a perfectly candid statement of their experience so far; and when they found that only one or two—a very small number—of the great number who were now co-partners had been tempted to realize the money that came to their share, he (the Chairman) thought they might be very well satisfied with the result.

The motion was unanimously carried.

Mr. HENRY BAILEY moved the declaration of the full statutory dividends at the rate of 6⅛ per cent. per annum on the "A" stock, and 5⅜ per cent. per annum on the "B" stock. He remarked that it would be seen from the accounts that ⅛ per cent. more was to be paid; this being due to the lowering of the price of gas. That the Directors were able to do this, showed that the Company were prosperous—that they had been able to earn sufficient, not only to allow a large sum to the consumers, but also a large sum to the co-partners, and also to pay the proprietors an additional, though comparatively small, amount by way of dividend. He thought the co-partners had been working better, and had contributed to this result.

Mr. JAMES CLOUDSLEY, J.P., seconded the motion; which was unanimously adopted.

Proposed by the CHAIRMAN, and seconded by Mr. OSBORN, Mr. James Cloudsley was re-elected to the Board; as was also Mr. James Randall on the motion of the CHAIRMAN, seconded by Mr. HAWARD.

Moved by Mr. ROW, and seconded by Mr. MOORE, Mr. Edward Crowne was re-appointed one of the Auditors.

Mr. CROWNE, in his acknowledgment, heartily complimented the Secretary (Mr. Topley) on the manner in which the books of the Company were kept.

A WELL-DESERVED INCREASE OF SALARY.

Mr. BAILEY observed that all must recognize, as the business of the Company increased, that the Secretary's work increased with it. The number of ordinary consumers continued to grow, and the number of the prepayment meters was growing still faster. He believed since the Secretary came into office, the output of gas had increased by 30 per cent. Besides, the co-partnership scheme started last year entailed much more work for both the Secretary and the office. This work had been most efficiently done. He therefore proposed that the Secretary's salary be increased by £150 per annum.

Mr. W. B. RANDALL seconded the motion; and Mr. J. L. CHAPMAN (as Auditor and proprietor) bore testimony to the Secretary's worth.

The proposition was cordially agreed to.

Moved by Mr. HAWARD, and seconded by Dr. SCOTT, the Chairman, Directors, officers, and employees generally were thanked for their services.

The CHAIRMAN having responded,

Mr. TOPLEY, in returning thanks for his department, acknowledged the kind remarks as to his services, and the tangible recognition that had been made of them.

Mr. BROADBERRY also replied to the vote on behalf of himself, his colleagues, and the staff of workmen.

A Centre of Social and Progressive Life.

The meeting on this occasion was held in a fine new building, which stands in a prominent position at the entrance to the works, and is a great improvement. Below there are the various works' offices; above, with an entrance outside the works' gates, is the large room in which the meeting was held. The meeting, by the way, was more numerously attended than any previous one. During the proceedings, the Chairman remarked that the room in which they were meeting for the first time that day would be employed in the future as the home of co-partnership at Tottenham, as well as for the Athletic Club and the other institutions of the men. It had been provided, and would be finished, with the object of being the centre of the social and progressive life of the employees of the Company. On the wall behind the Chairman, was displayed the following: "CO-PARTNERSHIP: Diligence and carefulness produce extra profit. Co-Partners share it."

WANDSWORTH AND PUTNEY GAS COMPANY.

Half-Yearly Report and Accounts.

The accounts for the six months ended the 30th of June last, which will be presented at the half-yearly meeting of the above-named Company next Tuesday, show a profit of £13,544. The revenue from the sale of gas was £53,179; from the rental of meters and stoves and the maintenance of incandescent mantles, £9775; from residual products, £20,017—the total receipts being £83,334. The expenditure on manufacture of gas was £51,267 (coal and oil costing £33,334, and repair and maintenance of plant £11,283); on distribution, £10,718; on management, £3349—the total expenses being £69,790. After providing, out of the above-mentioned £13,544, for the interest on debenture stock and on deposits and loans, there remains to the credit of the profit and loss account, with the balance brought forward, £19,225 available for distribution. The Directors therefore recommend that dividends should be declared at the statutory rates per annum (in accordance with the reduced price of gas at 1s. 11d. per 1000 cubic feet) of £8 2s. 6d. per cent. on the consolidated "A" stock, £6 12s. 6d. per cent. on the consolidated "B" stock, and £5 13s. 9d. per cent. on the ordinary "C" stock. Attached to the report is a slip, printed in red ink, to the effect that, as the Directors cannot withhold lists of the stockholders of the Company, they desire to caution the proprietors against being misled by exaggerated prospectuses of insignificant gas undertakings, which usually make comparisons between the prospects of the suggested investment and those of important and prosperous undertakings. They point out that a simple test of these statements would be to take the capital asked for in relation to the existing sale of gas, and compare it with the same conditions, for instance, in the Wandsworth Company.

BRENTFORD GAS COMPANY.

An Increased Make per Ton—The Question of Coping with the Growth of the District.

The Half-Yearly Ordinary General Meeting of the Company was held last Friday at St. Ermin's Hotel, Caxton Street, Westminster—Mr. ULICK J. BURKE in the chair.

The SECRETARY (Mr. William Mann) read the notice convening the meeting; and the report and accounts—noticed in last week's "JOURNAL," p. 335—were taken as read.

The CHAIRMAN said it was his pleasure once again to move the adoption of the report and accounts; and, in doing so, he thought it would perhaps be convenient to the shareholders to have the figures placed before them in some rather condensed form. The principal feature of these figures, they would be glad to know, was that the Company had received from sales of gas £185,307 in the period under review, as against £179,944 in the corresponding half of 1908—that was to say, there was an increase in the past six months of £5363. This was not an unsatisfactory return in itself; but it was further gratifying to know that it had been earned at a less manufacturing cost—less, in fact, by a sum of £9644; the actual figures being £89,703 for the past half year, as compared with £99 347 for the first six months of 1908. They would agree with him that this was a very desirable result, and that it argued very attentive and skilful management on the part of the officers and staff. This saving in the cost of manufacture had been made to a very large extent through a better return per ton of coal carbonized (the production having been no less than 12,116 cubic feet per ton, as against 11,247 feet), and, also, he need not add, by very close attention to detail. One feature in this close attention to detail had been the question of the reduction of the unaccounted-for gas. It would be within the recollection of the shareholders that at the time of the last meeting the Board were a little anxious about the unaccounted-for gas, which had risen, not only with their Company, but also with others. It had got up as high as 7 per cent. But now it had fallen to 5 per cent., which he thought, on the whole, they would accept as a normal figure. As a result of this good working, they had a sum of £88,959 applicable to dividends; and not only had those recommended been earned, but after their payment there would be a surplus over of £2536. Well, to all this there was, needless to say, a reverse side. They had, first of all, their old friends rates and taxes, which showed an increase of no less than £1553; and coke sales had also been against them, for there was a reduction under this head of £5985. Both of these were matters over which the Board could not very well exercise control. From one cause and another, the coke market had been very dull; and, from what he could hear, he did not, on the whole, think that they could expect much improvement at present. The weather also had been playing them pranks. If there was dark, cold weather in winter, people were glad to burn gas; and if there was a hot summer, they were also pleased to use the gas-stove for cooking, rather than have the kitchen over-heated by the coal-range. But instead of this, they had been experiencing a lot of weather that was just cold enough in the summer months to make people wish to use their kitchen coal-fires for the sake of the warmth, and so the Company did not experience that consumption of gas for cooking purposes which they rather looked for. In spite, however, of these drawbacks, there had been, as was stated in the report, an increase of 3·2 per cent. in the quantity of gas sold. The business generally was increasing, and not only the business, but the district. Now, because of this growing district, he wanted to say a few words as to what they were going to do to meet this growth. The works, so far as they went, were in excellent order—he did not wish to mislead the shareholders on this head. That was to say, they had been kept in as good order as skill and attention could keep them. But, to put it shortly, they were not up-to-date, and they were not equal to the strain which a large, and perhaps sudden, demand for gas would make upon them. The Company had, as he had told the proprietors before, experienced some difficulties now and again in the matter of pressures. The new 30-inch main which had been laid between Brentford and Southall tended to mitigate anxiety in this regard; but it was only a palliative. That was to say, it reduced the present calls on the plant; but it was not sufficient to provide for future highly probable increases in demand. The proprietors might, perhaps, have noticed that for the last four years or so there had been practical freedom from very thick fogs and from continuous sharp weather. But these were things that a gas manager always had to look out for; and if they had such calls, it might become a matter of grave anxiety as to how they should meet them. They had at present practically surplus manufacturing power equal to 2,800,000 cubic feet of gas per day. This sounded a very comfortable reserve; but unfortunately no less than 1,800,000 cubic feet of this surplus was supplied from No. 2 retort-house at Southall, which was in a not very satisfactory state. It was as satisfactory as they could make it; but it needed reconstruction. Therefore they could not altogether depend upon this surplus of 2,800,000 cubic feet. Now, then, let them look fairly at the position. They had a big, growing district, and what were practically sparse works to serve it. Well, this was no new story. He had harped upon it several times before. Again and again, he had advised the shareholders from the chair that, prosperous as was the Company, there was need for a large expenditure to keep pace with its growth, and to provide for its anticipated growth. At the last meeting, it would be remembered, he sketched the difficulties which were caused by the position of their stations. There was Brentford, in the middle of the district, very much cramped for room, and overtaxed. Southall, too, which was a station on which they largely relied, was quite on the outer edge of the district, and was so placed as to enhance the cost of coal supply and to reduce the amount that they could get for coke. This was a somewhat inconvenient and uneconomical state of things; and he could tell them that, so much was this the case, that the Board had had under serious contemplation whether it would not be wise to construct fresh works altogether. This, of course, would be a rather fascinating, if rather drastic, way of treating the question; but it would be rather a big order. It would mean scrapping a very large part of the works—with the exception of the gasholders; and, further, it would mean, what was a very serious matter to all companies now-a-days, a contest in the Parliamentary Committee Rooms. When undertakings went to the Committee Rooms now, they were very apt to be saddled with serious conditions; and it became a question, of course, whether it was better in these cases to accept the conditions laid down, or to withdraw the Bill. They could go to Parliament, and then withdraw the Bill if the conditions were so onerous that they did not feel inclined to accept them. But in this way they would have to wait a long while before they would know where they really were. This was a great consideration; for time with them in this regard was very important. Taking all these matters into account—and they had been very ably advised on the matter—the Board had come to the conclusion that it would be wiser, on the whole, to make the best of the material and parliamentary powers which they now had, and to reconstruct the works at Southall. The Board had had serious discussions over this; and they had not adopted the course mentioned without most careful consideration. But, having adopted it, he must inform the shareholders that the scheme was going to cost a good deal of money. It was, however, absolutely essential that they should spend the money; and therefore the situation must be faced. The Directors estimated that the work would cost not less than £80,000. A large proportion of this would be a capital charge; and, as they saw in the report, it was proposed to issue fresh stock to meet this. He thought what he had said gave them very shortly and plainly the position of the Company so far as he could state it. Before concluding, he had one very sad duty to perform, and this was to remind the proprietors that since the last meeting they had lost an old and highly-valued friend in Mr. Howard Charles Ward. For 58 years he had served the Company with a devotion, and indeed he might say with an affection, which had tended very much to establish its well-being and to advance its progress. The loss to the Board was a very great one. He only wished there were many more like him. In Mr. Ward's place they had elected Mr. D. Milne Watson, a gentleman who was well known to the shareholders—at all events, to many of them; and he could only congratulate the proprietors very heartily on the experience and knowledge which this new Director had brought to the counsels of the Board. He then moved the adoption of the report and accounts.

Mr. R. J. NEVILLE NEVILLE, in seconding the motion, remarked that Mr. Ward was one of his dearest friends. He had known him for about forty years. He did not think there was anyone present who remembered a meeting without Mr. Ward being present. He was the cheeriest of the cheery. He had the heart of a boy with the kindliness of a man; and many of the shareholders and employees of the Company would greatly miss their dear old friend Mr. Ward. The final appearance of Mr. Ward was at the last meeting—he was working up to the very end. He did not think it was necessary for him to say anything more than that, so far as he knew the Company and was able to form an opinion, the undertaking was in an excellent position. They had a first-rate Engineer—a man of whom they ought really and truly to be quite proud, and of whom they were proud; and they had also had the benefit of the advice of two of their recent colleagues, who had added greatly to the strength of the Board. He alluded to Mr. William King, an expert well known in the gas profession, and to Mr. Milne Watson, who was the General Manager of the Gaslight and Coke Company, and whose very position alone had brought enormous strength to the Brentford Company. They might thus, as far as he could see, face the future with the greatest possible confidence that the business would increase and their prosperity be maintained.

The resolution was at once carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. NEVILLE, dividends were declared for the half year to June 30 at the rate of 5 per cent. per annum on the 5 per cent. preference stock, 12½ per cent. per annum on the consolidated stock, and 9½ per cent. per annum on the new stock, 1881—subject to income-tax.

Mr. T. WILKINS proposed a hearty vote of thanks to the Chairman and Directors for the able manner in which they had conducted the business of the Company during the past half year.

Mr. PIPER seconded; and the proposal was cordially agreed to.

The CHAIRMAN, in acknowledgment, remarked that the present report was, on the whole, a gratifying one; and the Board would do their best to present similar ones in future.

NEWPORT (MON.) GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Wednesday—Mr. R. LAYBOURNE in the chair.

The SECRETARY (Mr. T. H. Hazell) having read the notice convening the meeting, the report of the Directors, with the accounts for the six months ending the 30th of June, was presented. The latter showed a balance of £10,120 on the profit and loss account; and the Directors recommended the payment of the statutory dividends.

The CHAIRMAN, in moving the adoption of the report, said the statutory dividends would be paid without drawing upon the reserve fund; and this was always satisfactory. The demand for coke had fallen off during the past half year; and, as a result, the receipts were £1346 less than for the corresponding period of last year. The saving in the price of coal had not been so large as the Directors had anticipated; but in other respects the accounts were about normal. He was pleased to direct attention to the increasing popularity of the Workmen's Thrift Society. They had £1246 on deposit; showing a recent advance of several hundred pounds, in addition to investments in the gas undertaking. It indicated the men's confidence in the Society.

Mr. CARTWRIGHT seconded the motion; and it was carried.

The retiring Directors and Auditor having been re-elected, a vote of thanks was accorded to the Directors and officials, for their efficient and satisfactory services.

The CHAIRMAN having briefly acknowledged the vote on behalf of his colleagues and himself,

The SECRETARY responded. He said that though they were assembled

at the 131st half-yearly meeting, the Company was as young and vigorous as ever. There had been a large increase in the consumers during the last nine years. In 1900, the number was 9042, and at the end of last year there were 13,486. The Company had done something for the comfort and well-being of the town, for in more than 11,000 houses they had supplied the means for comfortable cooking—cookers being supplied to this extent. All the members of his staff were imbued with a desire to give their most loyal services to the Company; and in proof of their confidence almost every one had invested his savings in the stock of the concern.

The ENGINEER (Alderman T. Canning) also returned thanks. He said it was a matter for satisfaction to learn of the success of the gas-works under the able chairmanship of Mr. Laybourne and the Directors, with the assistance of the officials. He regarded the works as progressive; and every member of his staff did his very utmost for the success of the concern.

CAMBRIDGE GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Wednesday—Mr. E. H. PARKER in the chair.

The SECRETARY (Mr. A. E. King) having read the notice convening the meeting, the report and accounts for the six months ended the 30th of June were presented. The latter showed a balance of £21,703 on the profit and loss account; and the Directors recommended the payment of the maximum dividends. They also recorded with satisfaction a further reduction in the price of gas to 2s. 8d. per 1000 cubic feet.

The CHAIRMAN, in moving the adoption of the report, congratulated the shareholders on the continued prosperity of the Company. He said that during the past half year the Directors had entered into two important contracts. They had undertaken to supply the Fulbourn Asylum with gas; and they anticipated the consumption would amount to about a million cubic feet a year. Secondly, they had entered into an important contract with Messrs. Chivers and Son to supply their factory at Histon; and there, he thought, the consumption would amount to some 3 million cubic feet per annum. These were two very important accessions to their business; and the Directors hoped they would show a reasonable profit. With regard to the half-year's working, they had made a profit of £6093, which was not quite sufficient for paying their dividend and mortgage interest, which amounted to £6208. But in the preceding six months they made a little more than they wanted; and taking the two half years as a whole, they had made their dividend quite easily, notwithstanding the fact that a short time ago they lowered the price of gas from 2s. 10d. to 2s. 9d. per 1000 cubic feet. It was satisfactory to the Directors to be able again to report that the price would be further reduced to 2s. 8d. from the June quarter. Each penny reduction the Company were able to make in the price of gas meant a saving to the consumers of about £1500. The quantity of coal carbonized during the half year was 479 tons more than in the corresponding period of last year; and the make of gas was 201,542,000 cubic feet, against 193,745,000 cubic feet—showing an increase of 7,797,000 cubic feet for the half year. This was a satisfactory feature. It was also gratifying to find the unaccounted-for gas was always diminishing a little. One very important point—and it was one upon which the Directors would like to offer their congratulations to the Engineer and Manager (Mr. J. W. Auchterlonie) and the carbonizing foreman—was that more gas had been obtained from every ton of coal carbonized during the half year. The figures were 11,116 cubic feet in the second half of last year, and 11,254 cubic feet per ton in the past half year—showing an increase of 138 cubic feet per ton. Prepayment meters were started in October, 1898; and now the Company were selling through these meters very nearly 50 million cubic feet a year. This showed what could be done by supplying the smaller houses. The actual quantity sold this half year was 24,119,700 cubic feet, and they received for it in cash £4632 10s. 4d. The average amount of gas for each meter during the past half year was 6083 cubic feet; and the average for the whole year was 12,428 cubic feet. These were very satisfactory figures. There were 205 new slot-meter consumers during the half year. There was an increase of 60 in the ordinary consumers, and of 89 in the number of cookers used. He thought he need hardly mention any further facts to prove that the Company was in a prosperous condition.

Mr. J. FOSTER seconded the motion; and it was carried.

The dividends recommended were declared; the retiring Directors and Auditor were re-elected; and the proceedings closed with a vote of thanks to the Chairman and Directors.

CHESTER UNITED GAS COMPANY.

The Ordinary General Meeting of this Company was held last Tuesday—Mr. J. G. FROST in the chair.

The SECRETARY AND GENERAL MANAGER (Mr. F. A. Pye) having read the notice convening the meeting, the accounts for the six months ending the 30th of June were presented. They showed that the balance to the credit of the profit and loss account, after providing for interest on debenture stock and dividend on the preference stock, was £5189; and the Directors recommended the declaration of an interim dividend on the ordinary stock of 2½ per cent.

The CHAIRMAN said there were several satisfactory features in the accounts; and perhaps the increase in the sale of gas, both within and outside the city, though small, was the most gratifying. Business had been very quiet in Chester, and this increased consumption was caused by an additional number of consumers and cooking-stoves. On the 30th of June they had 397 more consumers, and 330 cookers; making a total of 8678 consumers with 6224 stoves, in addition to those privately owned. The net result of the working was an increased balance of profit of £1000, which was carried to the net revenue account. During the half year, they had settled the terms of new lighting agreements with all the parishes outside Chester, under which larger burners and better lanterns would be used, which would secure to them a great improvement in the lighting of their respective districts. When these alterations had been completed, the several outside residential districts would be as well lighted as the best lighted thoroughfares in the city. The Company opened the year well; and as their success was undoubtedly due to the economy and efficiency of gas for lighting, cooking, heating, and other domestic purposes, they looked forward with every confidence to as satisfactory a report next half year. He moved that the report and statement of accounts be adopted.

Mr. R. L. BARKER seconded the motion; and it was unanimously carried.

An interim dividend at the rate of 2½ per cent. on the ordinary stock having been declared,

Mr. G. R. GRIFFITH moved, and Mr. H. A. LATHAM seconded, a vote of thanks to the Chairman and Directors; Mr. Latham referring with regret to the death of the ex-Secretary, Mr. James Pye, who, he said, was a good old servant of the Company.

The vote of thanks having been passed,

The CHAIRMAN said though Mr. James Pye had not been with the Company for some years, they all felt his death very much.

FINANCIAL ORGANIZATION AND ADMINISTRATION OF MUNICIPAL UNDERTAKINGS.

Proposed Regulations.

The attention of the Council of the Institution of Gas Engineers having been called by various members to the action of the Institute of Municipal Treasurers and Accountants in appointing a Sub-Committee to consider regulations for financial organization and administration, a circular on the subject has been issued by the Secretary (Mr. Walter T. Dunn), accompanied by the draft regulations prepared for the Sub-Committee's consideration. They contain the following proposals:—

That it should be made compulsory for every local authority of sufficient size to appoint a Finance Committee, with general powers of control and supervision of all matters of finance.

The term "Financial Officer" is defined as meaning "the Treasurer, Accountant, or Comptroller acting as the chief financial officer of the Council."

Separate annual estimates of capital and revenue accounts shall be submitted to the Finance Committee by every Committee of the Council, in such form, and under separate headings, as the Finance Committee may prescribe. The preparation of the estimates shall be by the various heads of departments in consultation with the financial officer.

"He" (presumably the financial officer) shall present the draft estimates to the various Committees for approval, and at the same time furnish the Finance Committee with a copy thereof.

The Financial Officer shall bring up to the Finance Committee the annual estimates approved by the various Committees.

In considering the capital estimates, the Finance Committee shall have regard to the maximum amount which, in their opinion, the Council should seek to borrow in the year.

No liability exceeding £50 shall be incurred (by any Committee) without the express sanction of the Council, except in the case of Committees acting in pursuance of statutory or specially delegated powers of expenditure.

It shall not be in order to submit estimates to the Council through any Committee other than the Finance Committee, except in cases of urgency or where the Council are under statutory obligations to proceed.

No recommendation or proposal involving expenditure on capital account shall be submitted to the Council until an estimate is submitted by the Finance Committee to the Council.

The Heads of Departments shall submit to the Financial Officer the contractor's detailed accounts and measure bill for his examination and comparison with the contract, specifications, and bills of quantities, also a statement showing the additions and deductions on the contract (if any); and the final certificate of the heads of departments is not to be issued until this has been done.

The Heads of Departments shall furnish the Financial Officer with particulars of all estimates and tenders.

The whole of the account keeping relating to stocks and stores, works accounts, and cost accounts shall be under the supervision and control of the Financial Officer; and all statements of costs shall be compiled by, and issued from, the Financial Officer's department.

It is pointed out in the circular that if the matter is allowed to go through on the proposed lines, the control of every department, whether trading or non-trading, will centre in the Finance Committee and the Financial Comptroller, who will override the powers now exercised by the other Committees and Chief Officers of the various departments. The Council of the Institution therefore trust the members will use every effort to strenuously oppose the movement outlined in the draft; and they will also be glad to be kept advised of any information bearing on the matter.

Southend in Darkness.—A breakdown in the generating station caused the failure of the electric light at Southend on Saturday evening, the 31st ult., from 9 until 9.15. Some of the shops were greatly inconvenienced; but as most of them are fitted with gas as well as electricity, they were able to remain open.

Cheaper Gas at Halifax.—The Halifax Town Council, on the recommendation of the Gas Committee, have adopted a revised list of charges for gas, under which the price to ordinary consumers in the borough is reduced from 2s. 3d. to 2s. 2d. per 1000 cubic feet, and to consumers outside the borough from 2s. 8d. to 2s. 6d. Reductions were also sanctioned for power purposes. The total result, it was explained, would be that there would be £3000 less profit available for the relief of the rates. For the past five years, the profits have averaged £13,900 per annum.

COMMERCIAL GAS COMPANY.

The Half-Yearly Report and Accounts.

The following is the report that the Directors of the Commercial Gas Company will present at the half-yearly meeting on Thursday.

The revenue account shows a net profit for the half year of £63,922 8s. 7d., which, added to the balance of £20,988 5s. 1d. brought forward from last year, produces a net revenue balance of £84,910 13s. 8d. Deducting therefrom £9026 12s. 10d. for interest, there remains standing to the credit of the net revenue account a balance of £75,884 0s. 10d. available for dividend. The Directors recommend the payment of dividends at the rates of £5 4s. per cent. per annum on the 4 per cent. stock of the Company, and of £5 per cent. per annum upon the 3½ per cent. stock, both less income-tax. The balance of the net revenue will be carried forward to the next half year. The Directors announce with much regret the death of their esteemed colleague, the Right. Hon. Sir John Colomb, K.C.M.G., who was for nineteen years a Director of the Company. In conformity with the Acts of Parliament regulating the Company, they have elected Mr. Henry Willingham Gell to the seat at the Board thus vacated. It will be for the proprietors to supply the vacancy in the auditorship consequent on the election of Mr. Gell as a Director. Messrs. B. W. Ellis and B. M. Gill, duly qualified proprietors, have given notice of their intention to seek election as Auditor.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on the 30th of June amounted to £976,405; that £1,076,875 had been added by conversion, making £2,053,280; and that £170,698 remained unissued out of the total authorized capital (including premiums) of £2,235,000. The total amount borrowed on the above-named date was £339,062 10s., and £135,937 10s. was added by conversion; making a total of £475,000, and leaving £79,226 to be borrowed out of the £550,000 authorized. The receipts on capital account amount, with premiums, to £2,584,665 4s. 5d. The expenditure stands at £1,434,075 17s. 6d., with a nominal amount of £1,212,812 10s. added by conversion—together, £2,646,888 7s. 6d. There is consequently a balance of £62,223 3s. 1d. carried to the balance-sheet. The net expenditure on capital account in the half year was £7546 (£8355, less £809 received for land and meters sold), apportioned as follows: New and additional mains, services, &c., £1834; stoves, £1751; prepayment meters and fittings, £4770. The reserve fund amounted at the close of June to £36,480; and the insurance fund to £34,598. The following is the

REVENUE ACCOUNT.

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£95,535 13 1		
Salaries of Engineer and officers at works	2,566 7 3		
Wages (carbonizing)	14,943 19 9		
Purification, including labour	1,330 6 8		
Repair and maintenance of works and plant, materials and labour, less £316 0s. 2d. received for old materials	24,392 19 7		
		£138,769 6 4	
Profit sharing		2,811 2 9	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£4,465 12 7		
Repair, maintenance, and renewal of mains and services, material and labour	7,427 9 5		
Repair and renewal of meters	2 131 1 6		
" " " " stoves	7,167 17 10		
" " " " prepayment meters and fittings	10,051 19 11		
Incandescent mantle maintenance	514 0 5		
		31,788 1 8	
Public lamps—lighting and repairing		2,3 9 4 11	
Rent, rates, and taxes		12,910 5 3	
Management—			
Directors' allowance	£1,250 0 0		
Company's Auditors	75 0 0		
Salaries of Secretary, Accountant, and clerks	1,289 6 9		
Collectors' salaries and commission	1,739 9 2		
Prepayment meter collection	2,730 6 7		
Stationery and printing	796 1 0		
General charges	1,916 10 10		
		9,796 14 4	
Bad debts		747 14 3	
Law and parliamentary charges		393 19 5	
Superannuations and allowances		1,200 6 0	
Official officers, &c.		144 6 4	
Total expenditure		£200,891 1 3	
Balance carried to net revenue account		63,922 8 7	
		£264,813 9 10	

Receipts.

Sale of gas—			
Common gas per meter at 2s. 6d. per 1000 cubic feet (95,019)	£193,618 12 5		
Public lighting and under contracts, common gas	5,672 5 2		
	£199,290 17 7		
Less discounts and allowances	3,810 6 11		
		£195,480 10 8	
Rental—			
Meters (23,523)	£2,833 1 11		
Stoves (56,558)	9,053 6 4		
Prepayment meters (70,718)	11,907 3 11		
Incandescent mantle maintenance	556 2 0		
		24,349 14 2	
Residual products—			
Coke, less £1294 13s. 2d. for labour	£26,179 14 9		
Breeze, less £1331 1s. 4d. for labour	1,835 6 2		
Tar	6,891 7 2		
Ammoniacal liquor and sulphate of ammonia	10,013 14 5		
		44,920 2 6	
Miscellaneous receipts—			
Rent receivable	£28 7 6		
Transfer fees	34 15 0		
		63 2 6	
Total receipts		£264,813 9 10	

The following are the statements relating to the manufacturing operations of the Company in the half year:—

Statement of Coals and Oil.

Description of Coal.	In Store Dec. 31, 1908.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store June 30, 1909.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	25,259	106,598	101,426	572	29,859
Cannel	365	..	188	..	177
Total	25,624	106,598	101,614	572	30,036
Oil—gallons	366,925	1,228,810	1,198,601	..	397,134

Statement of Residual Products.

Description.	In Store Dec. 31, 1908.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1909.
Coke—tons	11,805	62,238	13,153	56,800	4,090
Breeze—tons	6,428	11,030	..	11,916	5,542
Tar—gallons	588,830	1,209,516	..	1,320,039	478,307
Ammoniacal liquor—butts of 108 gallons	6,458	34,046	33,202	..	7,302
Sulphate of ammonia—tons	250	1,054	..	1,224	80

Statement of Gas Made, Sold, &c.

Quantity Made (meter register and estimated).	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,687,734	36,671	1,551,304	1,613,291	3921

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £26,129; coke and breeze, £2738; tar, ammoniacal liquor, sulphate of ammonia, &c., £7418; sundry stores, £35,012—total, £71,297. The figures this time last year were: Coal, oil, &c., £25,534; coke and breeze, £4503; tar, ammoniacal liquor, sulphate of ammonia, &c., £7173; sundry stores, £34,996—total, £72,207. A sum of £19,126 stands in the balance-sheet as employees' bonus and savings, compared with £15,856 at the end of June, 1908.

PAST YEAR'S WORKING IN BELFAST.

At the Meeting of the Council of the County Borough of Belfast last Tuesday, Mr. J. A. Doran, in moving the adoption of the minutes of the Gas Committee, said the accounts of the gas undertaking for the year ended the 31st of March had been made up, and the result was as follows: The gross profit on the manufacture and sale of gas and residuals was £44,368. Deducting dividends and interest on capital, £9849, and the equivalent of interest on redeemed stock, £3457, there was a net profit of £31,062, against last year's £39,940, or a decrease of £8878. The balance brought forward was £10,293; and when they added the net profits of the current year, £31,062, and the profit on the stove repairs account, the total credit on the profit and loss account was £41,549. Out of this amount the following sums had been set aside: Sinking fund, £5698; and interest on the insurance suspense account, £660; leaving a balance of £35,191. Out of this sum the Committee had contributed the following amounts for public purposes: To the Finance Committee in aid of the rates, £15,000; dividends and sinking fund on new City Hall redeemable stock, £11,382; and Parks Committee for the band fund, £100; leaving a balance at the credit of the profit and loss account of £8708. The Committee had made their contracts for coal this year; and with reference to the contract for oil, the Engineer (Mr. R. Sharpe) deserved great credit, since there was a total saving of something like £12,000 on the buying of this commodity as compared with that day twelve months. He thought this was very creditable. He might add that the contract was entered into for two years, which was a wise step. The increase in the output of gas was upwards of 7 per cent., and something over 15 per cent. more than the past two years; so that they were doing pretty well. He had promised to put a statement before the Council in reference to the extension of the gas-works, and he could assure the members that it was not his fault it was not ready. The delay was caused by certain of the staff being away on holidays.

Mr. M'Cusker called attention to the coal contracts, and said if the Committee had accepted a proposal at 13s. 9d. per ton they would have saved the ratepayers £1500. He moved, as an amendment, that the question of the contracts be referred back to the Committee for reconsideration. Mr. Gregg seconded the amendment. Mr. Riddell said Mr. Sharpe assured the Committee that the 13s. 9d. coal was not equal to that which had now been ordered. Belfast was the most successful Municipality in the kingdom with regard to the manufacture of gas, and to their officers and the Manager was due the greater part of the success with which the coal was converted into gas. Therefore, when they reported on the quality of the coal, their opinion was accepted.

Mr. Squire said it was only by the practical experience of a lifetime that one could judge of the best coal. That at 14s. 4d. per ton would be really cheaper than the coal at 13s. 9d. They must trust the Manager and those in authority. On being put, the amendment was lost by a large majority; and the minutes were adopted.

GLASGOW CORPORATION GAS DEPARTMENT.

[From Our Own Correspondent.]

It had been known for some time that a big decrease in the output of gas in Glasgow had been experienced; but few, probably, were prepared to learn, as is now disclosed in the published accounts of the Gas Department, that it was so large as upwards of 285 million cubic feet—equal to nearly 4½ per cent. Where was the decrease experienced? In the analysis of gas consumption contained in the report of the Gas Committee, it is found that in ordinary lighting there was a reduced consumption amounting to 319,607,400 cubic feet, and if there is deducted from this figure the extra 34,772,193 cubic feet consumed through prepayment meters, nearly all of which would be used in lighting, there is still a drop of nearly 285 million cubic feet—all but equalling the total decrease for the year. The quantity of gas used in engines was less by more than 32 million cubic feet, notwithstanding the effort of the Corporation a year ago to secure an output for power by raising the differential rate as between lighting and power from 3d. to 4d. per 1000 cubic feet; and the circumstances would seem to point to the inroad which suction-gas plant is making upon town gas for power. Gas used for manufacturing purposes, with a differential rate of 3d., increased by upwards of 16 million cubic feet. In this branch of business the Gas Committee have abandoned the flat-rate, and have withdrawn the differential rate for quantities of less than 30,000 cubic feet, making the charge the same as for lighting; but they offer a differential rate of 4d. for quantities above 30,000 cubic feet. The temptation is here to offer the remark that it was scarcely worth while making the distinction, as the number of manufacturers who would use less than 30,000 cubic feet of gas per annum must be few. The Committee have introduced a new charge, for gas used in hotels, clubs, and institutions, for other than lighting purposes—making the prices the same as for manufacturing purposes, but with the dividing-line at 100,000 cubic feet. The purpose for which such gas will be used will be cooking and heating. The concession of 4d. per 1000 cubic feet will doubtless be appreciated; but here, again, it is difficult to understand why, when caterers were receiving benefit, the keepers of restaurants and tea-rooms, of which there are so many in the city, should be excluded. There is a very strong feeling in the Corporation against differential prices. It was only in 1902 that a beginning was made, in an allowance of 4d. for gas used for motive power. For manufacturing purposes a reduction of 1d. was granted in 1905; and now the Committee are going a step farther. The history of differential prices has been a gradual concession, dictated by experience; and probably the intention in this year's new proposals may be to feel the way, and that we may expect next year, when the promised and much-needed Consolidation Bill is promoted, that the Committee will be prepared to go farther than they have as yet gone. The proposal was made in the Council on Thursday that, instead of lowering the price of gas to consumers for lighting and domestic purposes, the Corporation should reduce the charge for that used for public lighting by 2d. per 1000 cubic feet. It was an unworthy proposal, and was properly rejected. At the most, it would only have meant that the Watching and Lighting Committee would have been able to save £3600 a year, which would not have gone very far in the direction of benefiting the public, compared with the reduction of 1d. per 1000 cubic feet for gas used for lighting and domestic purposes—a benefit to the amount of £25,000 or £26,000.

A deficit was anticipated of about £26,000; but it was not realized. All that the Gas Committee went behind in the year's working was about £9000. To this sum there has been added £5000 which has been allowed as a special depreciation upon the portions of the works and plant of the Busby Gas Company which were taken over by the Corporation. This was done to make the book value of the Busby works correspond with the value put upon them by Mr. A. Wilson, the Engineer. As the Corporation were in the position, a year ago, of having in hand a surplus of £35,000, they are still, after allowing the £14,000 of a deficit for the past year, £21,000 to the good, and with better prospects in the matter of coal. The coal bill last year was down by as much as £85,000. The average price per ton was 10s. 11d., compared with 12s. 4d. in the preceding year—a reduction of 1s. 5d. per ton; and it is now announced that the coal to be used this year has been bought at a reduction of 1s. per ton upon last year's price.

Gas Committee's Report and Annual Accounts.

The report of the Committee on Gas Supply to the Corporation of Glasgow, together with the accounts for the year from June 1, 1908, to May 31, 1909, was submitted to the Town Council on Thursday last. In the report, the Committee state that

The gross revenue amounts to		£864,210
and the gross expenditure to	£674,446	
to which is added depreciation written off capital assets	66,896	
		741,342
Balance carried to profit and loss account		£122,868
The Committee had to meet the following requirements during the year:—		
(1) Annuities on stocks	£21,770	
(2) Contribution to Glasgow Corporation loans fund, in respect of Glasgow Corporation 3 per cent. stock redeemable in 1921, issued in lieu of converted gas annuities	7,812	
(3) Interest on borrowed money and redeemed loans	60,578	
(4) Sinking fund	46,725	
		136,885
Leaving a deficit on the year's operations of		£14,017
The credit balance as carried forward last year amounted to		35,488
from which deduct the deficit shown above of		14,017
leaves to be carried to the credit of next year's profit and loss account the sum of		£21,471

The decreased revenue from the sale of gas is mainly accounted for by the reduction in the price of 3d. per 1000 cubic feet made last year, the fall in the consumption of gas, amounting to 4·41 per cent., consequent on the general depression of trade, and the more general use of incandescent burners.

The Committee regret that the market for residuals has been unfavourable to the Corporation during the past year. The consequent reduction of income from ammoniacal liquor and tar amounts to £17,080, and is to be attributed to the smaller quantity of coal carbonized, and a lesser price obtained per ton; the quantity carbonized during the past year being 681,071 tons, as compared with 738,701 tons for the preceding year, a decrease of 57,630 tons. The average price received per ton of coal carbonized this year was 3s. 4·821d., as compared with 3s. 7·268d. for the previous year, a decrease of 2·447d. per ton. The contract for the sale of the products at the Provan works and the lease of the chemical works there, have been continued to Messrs. Brotherton and Co., Limited, for a period of five years from June 30 last, at an increased price.

The net sum realized from the sale of coke this year amounts to £100,303; being £18,496 under that of the preceding year, which is due to the smaller quantity sold and a lower price per ton obtained. The quantity of coke sold last year was 280,116 tons, as compared with 315,396 tons for the previous year, a decrease of 35,280 tons. The average price received was 7s. 8·36d. per ton, compared with 8s. 2·13d. for the previous year, a decrease of 5·77d. per ton.

The Committee observe with pleasure the much greater quantity of gas made per ton of coal carbonized, which was 10,015 cubic feet, as compared with 9522 cubic feet for the preceding year, an increase of no less than 493 cubic feet per ton.

The Committee advertised for tenders for coal to be supplied during the coming year, and have concluded contracts for the whole quantity required at prices under those of last year.

The rate of interest payable to the Corporation loans fund in respect of money borrowed was £3 3s. per cent., compared with £3 5s. 9d. per cent. for the preceding year. The Committee applied £2399 of the amount at the credit of the sinking fund to the extinction of £830 of £9 per cent. and £160 of £6 15s. per cent. gas annuity stocks; and the annuities formerly payable upon these stocks now cease to be a charge upon the revenue of the department. There has also been redeemed during the year, by the application of moneys at the credit of the same fund, £4084 of Glasgow Corporation 3 per cent. stock, and a further amount of £55,575 of loans raised under the Glasgow Corporation Gas Act, 1869, the Glasgow Corporation (Sewage, &c.) Act, 1898, the Glasgow Corporation (Tramways and General) Order Confirmation Act, 1901, and the Glasgow Corporation Order Confirmation Act, 1905. The sum carried to the sinking fund for redemption of loans, and redemption or conversion of annuities, was £46,725, and the accumulations and interest during the year amounted to £16,686; making the total addition to sinking fund for the year £63,411. The sinking fund, with its accumulations, now stands at £795,219, of which there has been already applied in the redemption of borrowed money, £3 per cent. stock, and annuities £710,285; leaving still available for either of these purposes the sum of £84,934.

Having regard to the result of the year's operations now recorded, and to the coal required during next year having been contracted for on favourable terms, the Committee recommend that the charge to be made for gas be reduced 1d. per 1000 cubic feet, this reduction to take effect as from the date of the last survey, and the rates to be charged to be as follows:—

	Per 1000 Cubic Feet. s. d.
I.—For lighting and domestic purposes, within the city and suburbs generally	2 0
II.—For motive power purposes, within the city and suburbs generally	1 8
III.—For manufacturing purposes, within the city and suburbs generally—	
For gas supplied in quantities of less than 30,000 cubic feet	2 0
For the excess beyond 30,000 cubic feet	1 8
IV.—For hotels, clubs, and institutions, other than for lighting purposes—	
For gas supplied of less than 100,000 cubic feet	2 0
For the excess beyond 100,000 cubic feet	1 8
(The above rates to be applicable only for gas consumed in one and the same premises; and such supply shall be measured by a separate meter.)	
V.—Within the Milngavie area of supply, referred to in the Glasgow Corporation (Gas, &c.) Order Confirmation Act, 1902, 1s. per 1000 cubic feet extra on the above-mentioned rates.	
VI.—Supply through prepayment meters	2 7

In the analysis of gas consumption (p. 401) will be observed the extra demand for gas on the prepayment system; the increased consumption being 34,772,193 cubic feet, or 13·23 per cent.

During the year, the Corporation acquired the gas mains, meters, and stoves of the Busby and District Gas Company, Limited, so far as these are situated within the parishes of Cathcart and Eastwood, at the price of £9000. The acquisition removes all opposition to the progress of the Gas Department in this district.

The number of gas-engines in use and the total horse power for this year and the preceding year are as follows:—

	Number.	Brake Horse Power.
May 31, 1908	1,685	18,087
May 31, 1909	1,690	19,003
Increase	5 = 0·296 p. ct.	916 = 5·06 p. ct.

The works and mains have been maintained in an efficient condition during the year out of revenue. The greatest quantity of gas sent out during the year in 24 hours was 34,830,000 cubic feet. The maximum daily make was 31,210,000 cubic feet. The unaccounted-for gas during the year was 9·29 per cent., as compared with 7·97 per cent. the preceding year; the increase being due to the large decrease in the gas sold, and also to a difference in the dates of the survey of meters, compared with the previous year. Upwards of 20 miles of new mains have been laid during the year.

The following is an analysis of the sale of gas for the past year as compared with the sale for the previous year:—

—	Year 1907-8. Rate per 1000 C. Ft.	Consumption.	
	s. d.	Cubic Feet.	
I.—Within the city and suburbs generally:—			
(1) Lighting	2 1	23,098,500	
(2) Do.	2 4	4,971,288,200	4,994,386,700
(3) Gas-engines	1 9	7,708,700	
(4) Do.	2 0	348,783,500	356,492,200
(5) Manufacturing purposes	1 9	1,800	
(6) Do. do.	2 0	205,170,300	205,172,100
(7) Contract gas	2 4		557,292,700
II.—Within the Milngavie area:—			
(8) Lighting	3 1	43,000	
(9) Do.	3 4	17,974,800	18,017,800
(10) Gas-engines	3 1		410,800
(11) Manufacturing purposes	3 1		1,198,900
(12) Contract gas	3 4		1,564,125
III.—Prepayment supply	2 6	110,364,600	
Do.	2 11	152,461,828	262,826,428
			6,397,361,753
Used at works			75,272,200
			6,472,633,953

—	Year 1908-9. Rate per 1000 C. Ft.	Consumption.	
	s. d.	Cubic Feet.	
I.—Within the city and suburbs generally:—			
(1) Lighting	2 4	21,266,800	
(2) Do.	2 1	4,663,552,000	4,684,818,800
(3) Gas-engines	2 0	7,473,900	
(4) Do.	1 9	316,823,000	324,296,900
(5) Manufacturing purposes	—		
(6) Do. do.	1 9		221,698,300
(7) Contract gas	2 1		563,883,870
II.—Within the Milngavie area:—			
(8) Lighting	3 4	33,700	
(9) Do.	3 1	17,144,600	17,178,300
(10) Gas-engines	2 9		460,500
(11) Manufacturing purposes	2 9		1,058,200
(12) Contract gas	3 1		1,673,750
III.—Prepayment supply	2 11	16,487,221	
Do.	2 8	281,111,400	297,598,621
			6,112,667,241
Used at works			74,346,200
			6,187,013,441

Decrease, 285,620,512 cubic feet = 4·41 per cent.

The number of ordinary meters in all on May 31 was 225,422, as compared with 227,503 for the preceding year—a decrease of 2081. The number of prepayment meters in use on May 31 last was 43,900, as compared with 35,466 for the preceding year, or an increase of 8434. During the year, 30,404 meters were repaired. The number of gas-stoves on hire as at May 31, 1909, was 48,548, as compared with 43,566 for the preceding year, an increase of 4982. At the same time, there were also 10,380 small stoves and grills let out free of charge, as compared with 5903—an increase of 4477. This substantial increase in the number of these gas-consuming appliances will require a larger supply of gas, and the department will accordingly benefit thereby. In addition, it will also tend to mitigate the smoke nuisance within the city. The number of gas heating and cooking appliances sold during the year was 2777.

In the capital account, stock capital has been reduced, by redemption and conversion, from £415,000, bearing annuities to the amount of £34,762, to £260,127, bearing annuities to the amount of £21,694. The loan capital authorized amounts to £4,200,000; but of this sum £1,400,000 is applicable to electric lighting. The total amount borrowed for gas purposes has been £1,344,815, all of which has been obtained from the Corporation loans fund at £3 3s. per cent. interest. There has been redeemed £525,185. For electricity purposes there has been borrowed £1,213,687, and redeemed £186,312. There are borrowing powers remaining to the amount of £930,000. The year's capital expenditure amounted to £35,512. Of this sum, £1139 was expended upon waggons and coke-screening plant for the Dawsholm works, £895 upon coke-screening plant, &c., for the Tradeston works, and £223 upon the Tradeston chemical works. The capital charge during the year for pipes and cost of laying was £16,738, for gas-meters £13,205, for gas-stoves £10,642. These sums make a capital outlay of £42,843; but there are deductions, in respect of properties sold or transferred, to the amount of £7531, leaving the net capital charge for the year at £35,512. The total sum stated in the general capital account is £2,459,310, made up of sums borrowed, and the £3 per cent. Corporation stock issued for the conversion of annuities, together with £611,646 of moneys paid out of the sinking fund for redemption of loans. The capital expenditure is stated at £2,410,367; leaving a balance at credit of £48,943. The outlay upon the Temple works (£233,573) has been reduced by allowances for depreciation—of which £2515 was applied last year—to £160,587. The outlay upon the Provan works has been reduced from £780,037 to £722,661; upon the Old Kilpatrick works, from £6852 to £1641; upon the Milngavie works, from £2579 to £953; upon the chemical works at Dawsholm, from £48,038 to £29,208; upon the chemical works at Tradeston, from £17,280 to £11,838; upon the chemical works at Provan, from £53,562 to £46,795; upon pipes and cost of laying, from £855,702 to £487,641; upon gas-meters, from £558,379 to £223,032; and upon gas-stoves, &c., from £173,130 to £64,347. There is a premium account to the amount of £174,311, which has been reduced to £135,065.

In the revenue account, the income is stated at £864,210, a decrease of £141,943. There was derived from the sale of gas £631,421, a decrease of £107,055. Coke realized £100,303, a decrease of £18,495; and ammoniacal liquor and tar, £119,654, a decrease of £17,080—the total decrease upon residual products being £35,576. On the expenditure side, 681,071 tons of coal cost £372,254, a decrease of £85,221. Purifying materials, and oil, water, and sundries at works cost £27,334, a decrease of £6732. Salaries of engineers, superintendents, and officers at works amounted to £4842, a decrease of £176; workmen's wages amounted to £60,168, a decrease of £6852; and the carting and stabling account amounted to £2742, a decrease of £128. The total expenditure upon the manufacture of gas was £541,388, a decrease of £101,787. The distribution of gas cost £64,126, a decrease of £6172; the stove and appliances account amounted to £11,479, a decrease of £3645; rents and feu duties amounted to £8416, a decrease of £1187; and rates, assessments, and taxes, upon a valuation of £136,736, which was £11,869 higher than a year before, amounted to £31,879, an increase of £3274. Management cost £15,246, an increase of £183; law charges amounted to £87, a decrease of £26; and parliamentary charges were £10, a decrease of £877. Depreciation was allowed for at the rate of 1½ per cent. on the gas-works, amounting to £22,063; at the rate of 3 per cent. on the chemical works, amounting to £2895; at the rate of 2 per cent. on pipes, amounting to £10,137; at the rate of 6 per cent. on meters, amounting to £15,137; at the rate of 10 per cent. on stoves, amounting to £7305; and at the rate of 2½ per cent. on premium, amounting to £4358. The total ordinary depreciation amounted to £61,896. In addition, there was a special depreciation allowed out of revenue, to the amount of £5000, upon the property acquired from the Busby and District Gas Company, Limited. The total sum on the expenditure side of the revenue account was £741,342, which left a balance, as stated previously, of £122,868.

The quantity of gas made at Provan amounted to 2,213,433,000 cubic feet; at Dawsholm, to 2,617,485,000 cubic feet; and at Tradeston, to 1,990,044,000 cubic feet. The total gas made amounted to 6,820,962,000 cubic feet; the gas sold or accounted for, to 6,187,013,441; and the gas unaccounted for, to 633,948,559 cubic feet—equal to 9·294 per cent.

Debate in the Council.

Bailie M. W. MONTGOMERY, the Convener of the Gas Committee, presented the report and accounts.

Mr. W. NELSON said that at a meeting of the Sub-Committee of the Gas Committee on Finance, on July 28, the minutes stated that the Treasurer submitted a statement showing the estimated revenue and expenditure for 1909-10 of the Gas Department, and that the Sub-Committee, having considered the same, and the draft of the annual accounts and balance-sheet of the Gas Department for the year to May 31, 1909, along with the draft of the annual report, approved of the annual accounts, and resolved to submit the same to the Gas Committee at their next meeting, but continued consideration of the report; and that at a meeting of the same Sub-Committee on July 30, it was stated that they "resumed consideration of the draft annual report to be submitted to the Gas Committee, and, having had again before them a revised estimate of revenue and expenditure for 1909-10, agreed to submit to the Gas Committee the report now adjusted." This revised estimate was not submitted to the Gas Committee; and he wished to know whether it was competent to discuss the accounts of the Gas Committee when such an important document as that had neither been before the parent Committee nor the Corporation. Standing Order No. 19 read: "A copy of the detailed annual accounts and estimates of each department shall be sent to each member of the Committee interested at least a week prior to the meeting of the Committee at which they fall to be considered."

Lord Provost M'INNES SHAW said this was an important point, and he would call upon the Town Clerk to deal with it.

The DEPUTY TOWN CLERK (Mr. J. Bowers) said that Mr. Nelson having notified him of his intention to put the question, he had looked into the matter. This was only the second year that the so-called estimate had been prepared by the Gas Treasurer for the information of the Finance Committee of the Gas Department. No copies of this estimate had ever been sent out to the members of the Finance Committee prior to the meeting at which the Committee had before them the draft report which formed part of, and was submitted to the Corporation along with, the annual accounts of the Gas Department. Copies of the estimate referred to had never been sent out to the Gas Committee previous to the meeting at which the Committee considered the report; and no mention of any such estimate was made in the minutes of the Gas Committee dealing with the report. He had carefully considered the provisions of Standing Order No. 19, and the provisions of the previous Standing Order which was superseded by the existing one; and he was of opinion that neither of these Standing Orders was ever meant to apply to any estimates of any department except those which had to lay on assessments. This was not an assessment department; and therefore Standing Order No. 19 did not apply to it.

Bailie MONTGOMERY then moved approval of the accounts. He said that gas was a commodity so much used by the community in one form or another—in lighting, in heating, or in cooking—that any particulars regarding the Department must be of more than passing interest to the great body of the citizens. The revenue of the department during the past year amounted to £864,210. This was a considerable decrease on the previous year. Their revenue, however, was a fluctuating quantity, varying from year to year according to the price of gas. As they reduced the price of gas last year 3d. per 1000 cubic feet, a decreased revenue was to be expected. There was also a falling off in the consumption of gas, amounting to 4·41 per cent., as compared with the preceding year. This was due to the dull trade which had prevailed; for it was quite natural that all people should try to economize in the

consumption of gas as well as in other directions. The revenue from residual products had also suffered from the same cause; there being a decrease of £35,000 under this head. The gross expenditure amounted to £674,445; and after adding depreciation, sinking fund, and other charges, there was a deficit on the year's operations of £14,000. This was not alarming, because last year they carried forward a balance of £35,000, and, owing to the reduction in the price of gas, they estimated that the accounts would show a deficiency of £26,000; so that, in reality, the year's working had turned out very much more favourably than the Committee had anticipated. Deducting the £14,000 deficit from the £35,000 balance from last year, there remained a balance of £21,000 to carry forward to next year's account. A very notable feature in the accounts was the quantity of gas produced per ton of coal carbonized; this being 10,015 cubic feet, as compared with 9522 cubic feet last year—an increase of no less than 493 cubic feet per ton. This gratifying result reflected very great credit on Mr. Wilson, the Station Managers, and the staff. Another interesting feature was the rapid development of the automatic meter. They had 43,900 of these in use on May 31 last, as compared with 35,466 for the preceding year, an increase of 8434. This showed that the introduction of these meters had met a very much felt want among the working classes. There was also an increase to the extent of 4982 in the number of cooking-stoves on hire. This department of their work came in for a good deal of criticism a few months ago; some members being of opinion that it should not be encouraged. He differed entirely from this opinion. He believed it was a department which they should try to develop. He thought the Gas Department should bring home to the public the advantage of gas for cooking and heating. It was cheap, convenient, and satisfactory in its results; and a greater use of these stoves would undoubtedly mitigate to some extent the smoky atmosphere of the city. They proposed this year to reduce the price of gas by 1d., making it 2s. per 1000 cubic feet—the lowest price at which they had ever supplied it. The reduction would be good news to the consumers. There never was a time when cheap commercial commodities were more needed than now; and with the reduction in the domestic water-rate, and in the gas, they hoped to lighten the burden on the ratepayers. He was sorry to notice that they had an amendment to this by Mr. Nelson, who was to propose that they should not reduce the price of gas this year to the general consumer, but that they should allow 2d. per 1000 cubic feet off for lighting. This involved a new and very important principle. The Corporation had resolved to apply in next session of Parliament for a consolidation of all their Gas Acts; and he was very strongly of opinion that the eve of their going to Parliament for such a purpose was a very inopportune time for departing from the lines which had governed the Gas Department since it was instituted. They were justified in making the reduction they proposed, as they were carrying forward £21,000, and had purchased their coal for the coming year at 1s. per ton less than last year, which gave them £35,000 or £40,000.

Bailie PAXTON, the Sub-Convener, seconded.

Mr. NELSON said his difficulty was that, as a business man, he would have expected the Corporation to place before them data which would have enabled them to pass an intelligent judgment on the proposal which was before them. They were asked to accept what the Gas Committee had dictated to them, without any information being made available. When he entered the Council, his opinion was that if a question of rates and taxes came before them, full information should be obtained by every member. They had been told that they could not have the estimates, as they were merely rough ones. He held in his hands the estimates which were presented at the first meeting; and he thought he was entitled to refer to them. If not, then he would ask the Corporation to continue the consideration of the minute as a whole, until they had the figures properly before them, to enable them to deal with them. In the estimates, it was stated that the permanent officials of the Gas Department, having gone carefully into the cost of the gas supply for the current year, produced a statement to the Sub-Committee, in which they pointed out that, giving full value for the reduction in cost by reason of the cheaper coal this year, making reasonable allowance for maintenance and repairs to works and pipes, and for the outlay incurred during the recent winter for the benefit of the unemployed, making all reasonable provision for the current year's charges, and, on the other hand, after giving full credit for the estimated results from the sale of gas at last year's rate of 2s. 1d., and the price of residual products, there would be a deficiency of £607. This was the statement of the responsible officials who were managing the department. At the meeting, there was no proposal to reduce the price for domestic lighting; but the meeting practically dealt with the proposal to continue the price, because they did not see their way, with the burdens upon them, to make a reduction on this head, and they continued the proposals, with a view to obtaining the opinion of the Town Clerk as to whether they could make any reduction for power purposes, to hotels, and also as to whether they could do anything for the public lighting department of the city. At the meeting on July 30, called at less than 24 hours' notice, the whole matter was turned over; and it was proposed to reduce the rate for domestic purposes by 1d. per 1000 cubic feet. This meant between £25,000 and £26,000 loss by the concession of 1d. for domestic purposes. In other words, the proposal was to give gas to the citizens, and to people outside the city, at less than cost price. He objected to this; and he thought the better way of proceeding was as he proposed. He had every sympathy with the citizens, and would be glad to see them have gas at a reduced price, if they could possibly do so; but, as a business man, he said it was not a prudent course, in face of the figures submitted to them by their responsible officials, to give gas at less than they could produce it for. With regard to the proposal to make a reduction to the Public Lighting Department, the gas bill in respect of public lighting and stair lighting was about £47,000. The Manager indicated to them that, in instituting a comparison between the ordinary consumer and the city for public purposes, there was a distinct saving in the case of the city, in the cost of surveying and collecting, and also in maintenance—a saving representing 2d. per 1000 cubic feet. The Sub-Committee on July 28 were advised that it was quite within their power to make a reduction to the Public Lighting Department. He moved that no reduction be made in the price of gas for lighting and domestic purposes, and that the rate for public lighting be reduced to 1s. 11d. per 1000 cubic feet. This amendment was entirely in the interests of the citizens; and the Gas Committee should look at the matter in a reasonable spirit. There did not seem to him to be any reason why a small lodging-house keeper in the city should not get gas for power purposes at the same rate as the large hotel-keepers; and until the Gas Committee came to a resolution with regard to the gas as it was to be used for such purposes, he thought it was out of place for them to make the proposal they did.

Mr. A. M. URE seconded. The citizens, he said, were not asking for a reduction in price. On the other hand, they had any number of complaints with regard to the lighting of the streets; and as the Watching and Lighting Committee were large consumers of gas, he thought they should receive a reduction. If the rate were reduced to them, the Watching and Lighting Committee might light the streets better. The people were leaving the city by thousands; and it was the duty of the Corporation to do what they could to retain them, by lightening the rates.

Baillie GUEST agreed with the Convener that there should be a very good reason before they made any departure from their current policy. In what the Committee proposed, they were just doing what they had done all along—they were reducing the price of gas because they thought they could afford it. It might seem to some councillors that to make a concession for public lighting would be a greater concesssion to the citizens than would be a reduction for general lighting. He was very anxious to make a concession for public lighting; but if they did so, the same concession would require also to be given to every suburban authority. In making the proposals they did, the Gas Committee were actuated by a desire to get an increased demand for gas during the day. A lower rate for public lighting would not be at all likely to induce an increased demand during the day. The Committee, he believed, felt that the more they could do to give cheap gas for manufacturing and cooking purposes, the more likely they would be to induce an increased demand for gas during the day, and during the summer—thereby introducing a better system of operating their gas-works, and also helping to purify the atmosphere. He cordially supported the minutes. Like some members of the Council, he was at one time much dissatisfied that the figures were not given them on which they were to base their estimates for the ensuing year; and it was only after a rather strenuous effort that he got the Treasurer to put down the figures in black and white for their consideration. But there were many reasons why it was not desirable to bring the figures before the Council. He would also remind the Council that the Gas Committee had power to do business without coming before the Council.

Mr. J. YOUNG described himself as one of the three renegades, and as being quite proud of the position he occupied. The Gas Committee manufactured a commodity which they were trying to sell; and he thought the largest consumer should be entitled to the best terms. This was the broad principle on which he went. He found that the streets of the city required to be better lighted, so that the citizens might have greater protection. If they were able to sell gas at 1s. 8d. to traders who did something with it, and made a profit, they should be prepared to sell it at the same figure to the Watching and Lighting Committee, who consumed over 500 million cubic feet annually, and who gave them large sums of money without any further effort than merely crossing the lobby to get a cheque. They were told that the Watching and Lighting Committee might tax the people for the lighting of the streets; but he thought the Gas Committee should make a concession to them in the matter of price; and they were only asking half the concession which was going to be granted to others. He was under the impression that the poorer class of the citizens would get greater benefit by having their rates reduced than they would by the small reduction of 1d. per 1000 cubic feet for gas.

Mr. P. G. STEWART said that in the old days a man in a single apartment had gas at the same rate as the man in a west-end flat, and he said they were going wrong altogether. Ever since Mr. Wilson was appointed, he had been trying to get a little on here, and a little on there. They had, at the present time, no less than 13 different rates; and if they agreed to the proposals of the Gas Committee, they would have no less than 33 different rates. He hoped the Council would send the minutes back to the Committee. What was the good of taking out of one pocket and putting into another? They had a surplus of £21,000; and they ought to hand it back to the consumers, by lowering the price of gas.

Bailie RUSSELL considered it very extraordinary to hear any member of the Council objecting to the public getting the benefit of a reduction in the price of gas. He quite agreed with Mr. Nelson that they were, perhaps, sailing too close to the wind; but he thought they were justified in running the risk of having a small deficiency at the end of the year for the benefit of the community. The community sadly needed just now the benefit of this 1d. per 1000 cubic feet. He understood that to charge 1s. 11d. for public lighting would mean a cost to them of about £3600. The proposal of the Gas Committee gave the public lighting authority a reduction of £1800. A great deal had been made of the estimate which was laid before the Committee. In order that they might be able to form an opinion as to the business before them, a small jotting was made; and it should be destroyed after it had served its purpose. He hoped that the Council would adopt the Committee's recommendation.

Bailie DUNLOP was entirely dissatisfied with the statements which had been made, and entirely at a loss to know where they were. The amendment he would move was that every member of the Corporation should be furnished with the estimate which was before the Committee on July 30, and that they continue the consideration of the accounts till the next meeting of the Council, for that purpose. They had no knowledge of the existence of such a document until they came there that day.

Mr. W. F. ANDERSON seconded. He did not think that any citizen would be found who would be willing to pay 1d. more per 1000 cubic feet for gas, in order to allow the Watching and Lighting Committee to reduce their rates; and he did not think that Mr. Nelson would be willing to give the benefit of the reduction to outlying districts. Surely the ratepayers of Glasgow, who were responsible for the gas undertaking, should be the first to get benefit. He absolutely disagreed with

the allocation proposed by the Committee. The big people, under it, were going to get all the benefit. If the Gas Committee sold 30,000 cubic feet of gas to a particular individual, he did not think it mattered very much to the Committee whether the person who was to use the gas baked scones with it or lighted the streets. If the proposal of the Committee were carried, and a consumer should find that he had consumed 29,500 cubic feet of gas, it would pay him to leave the gas burning all night, in order to get the reduction in price. He wanted to point out that when gas was used for manufacturing purposes, the cost of the gas was included in the cost of the article made. He thought the proposals of the Committee were not fair, and that differential rating should be put upon an intelligible basis. The time was when everyone paid the same for gas. Now the Gas Committee, he supposed, were going to give them a sort of "Chinese puzzle" in the matter of prices. He wanted to know why one should get any benefit over another.

The LORD PROVOST explained that by Act of Parliament they could not make a differential charge for lighting purposes to private users, but they could for public lighting.

Mr. T. CALDERWOOD pointed out that if they reduced the price of gas by 1d., everybody would participate in the benefit. He would have thought that everyone would have been glad of the proposal; but apparently the reverse was the case. He understood the question was going to be considered by the Gas Committee, probably within twelve months, when they came to the consolidation of their Acts of Parliament. He hoped the Committee, when they took up the question, would deal fairly with the Watching and Lighting Committee; but he did not think they should be spasmodic and jump to conclusions. If they could reduce the price of gas 1d. per 1000 cubic feet, he felt convinced they would do a thing which would be greatly appreciated.

Mr. J. WILLOCK considered it was all nonsense to say that the poor man was not getting the same chance as the rich man. All were to have the reduction. He pointed out that the Gas Committee had written £5000 off the value of the Busby Gas-Works, which could very well have been spread over ten years; but the Committee had thought it better to write this off at once. He had great sympathy with the Watching and Lighting Committee; but they should scarcely be mentioned, because, if the Council entertained the proposal with reference to public lighting, then Govan, and Partick, and other parts, would come in. Mr. Nelson's proposal would confer benefit on the community to the extent of about £3600; but the proposal of the Gas Committee would give them £25,000 or £26,000. Which of these sums were they going to have?

Deacon-Convener MACDONALD supported the amendment. It was a matter of indifference to him whether an outsider benefited or not. They visited outside people in their homes; and outside people visited them. There were plenty of people who did not use gas, but who paid very heavy rates. The streets should be lighted as cheaply as possible.

Dr. M'CONNELL considered that Mr. Anderson's argument all through was conclusive in favour of the minutes.

Mr. MACMILLAN held that the consumers of gas had a title to get any reduction which might be going. He also held that the community should get some reduction, in consideration of the very large quantity of gas which was consumed in the public lamps. It was proposed to give gas to hotel keepers at 1s. 8d. per 1000 cubic feet, on the ground that they would use the gas when others were not doing so. But the streets would be lighted for a great part of the time when nobody else was using gas. He thought that if the Convener took the minute back for further consideration, the Committee might see their way to make some little concession to the large consumers—the Watching and Lighting Committee and the other lighting authorities. He moved that the minute be taken back.

Mr. J. STEWART seconded.

Mr. S. MURRAY thought they had overlooked the difficulty there was in discussing the matter without prejudicing the very thing they were aiming at—the securing of a Consolidating Act. The Committee were anxious to have this Act passed; and under it the claims of all the consumers would be considered. They proposed this year to reduce the price of gas by 1d. all over. It was quite true that they were sailing close to the wind; but he belived they would get through without any serious deficit. Surely if ever there was a year in which they ought to stretch a point, and make a reduction for the benefit of the ratepayers generally, it was this year; and he sincerely hoped that the Council would pass the accounts, and allow the business to go on. They were practically agreed as to what was wanted; the question was how it was to be done.

Mr. NELSON intimated that, in view of the discussion which had taken place, his main purpose had been served, which was to call attention to the irregular form in which the accounts had been presented; and he was prepared to withdraw his amendment.

Bailie DUNLOP stated his agreement with a proposal of the Lord Provost that, if the Council should decide that the minute be taken back, the revised estimate should be furnished.

Bailie MONTGOMERY, in winding up the discussion, said it had ever been the habit of the Gas Committee to bring forward estimates to the Corporation; and this was the first time their practice had been questioned. The Gas Committee were exceedingly anxious to consider the matter of public lighting, which had been made the main objection that day; and if the Council passed the minutes, he hoped they would be in a position to deal with the consolidation of their Acts of Parliament without the prejudice which might ensue if the minutes were not passed. The present was a most inopportune time for dealing with the question which had been raised.

The Council then divided, when 34 voted for approval of the minute and adoption of the Committee's report and accounts, and 22 voted for the minute being sent back to the Committee.

Last Friday, Messrs. Allsopp's latest method of advertising their lager beer—a huge airship bearing these words—hovered over the town of Burton-on-Trent. The work of preparing the ship for flight commenced at six o'clock in the morning; the supply of gas for filling it being obtained direct from one of the mains of the Corporation. The quantity of gas used was about 7500 cubic feet; and about 2½ hours were occupied in the process.

STOCKPORT CORPORATION GAS UNDERTAKING.

Gas Engineer's Report—Appropriation of Profits.

At the Meeting of the Stockport Corporation last Wednesday, the report of the Gas Engineer and Manager (Mr. S. Meunier) was presented. It furnished the following particulars in regard to the working of the gas undertaking in the year ended the 31st of March last.

Mr. Meunier opened his report by expressing gratification at finding that, contrary to the experience of the large majority of Gas Departments throughout the country, the profits at Stockport, instead of showing a decrease, were actually much higher in amount last year, and once more constituted a record. In view of the prevailing bad trade, the higher price of coal, and the steady decline of the values of residuals, such an event was not foreseen, though the much improved results obtained by an addition to the carbonizing plant which was brought into full use during the year led to the hope that any reduction in profit would, at any rate, be largely minimized. The make of gas in the year showed the large increase of 1269 cubic feet per ton of coal carbonized. This not only materially reduced the amount of plant brought into use, but enabled an increased quantity of 15,197,000 cubic feet of gas to be produced over the year with a reduction of 3234 tons in coal and cannel carbonized—showing an actual saving in the cost of coal, though the price per ton of that used during the year was 11s. 8d., against 11s. 3·60d. for the previous year. There was an increase of £877 in the receipts for gas, and a decrease of £1413 in those from residuals, of which £1175 was on coke alone. The decrease would have been greater but for the fact that the quantity of ammoniacal liquor made per ton of coal carbonized showed an increase of 4½ gallons, equal to 3¼d. per ton of coal carbonized (apparently due to the addition to the plant previously referred to), and also that £597 was received for spent oxide—an item which does not appear in every year's accounts. The total income showed an increase of £149 14s. 3d.—*i.e.*, £116,810 4s. 11d., against £116,660 10s. 8d. recorded for the year 1907-8. Turning to the expenditure, the outstanding feature was the large reduction in the cost of manufacture, amounting for coal and carburetted water gas to no less than £4009, made up principally of coal, £3375; wages, £945; and oil, £517; the last being due to a somewhat improved contract. The reduction on coal was not due to lower prices, as the cost per ton used was practically 4½d. higher than in the previous year. The cost of the distribution of gas was reduced by £618, principally on maintenance of mains and services. How far this item had been effected by there being no cases of naphthalene, attention to which is charged to this account, could not, Mr. Meunier stated, very well be calculated; but the fact remained that, since the addition to the carbonizing plant previously mentioned, no signs of naphthalene had been observed in the district. This was very gratifying, as for a number of years the complaints arising from this trouble had been gradually increasing and becoming more serious—necessitating extra labour, at great expense, being employed to minimize inconvenience and loss to the consumers. The gross profit for the year was £40,381 5s. 11d., equal to 15·65 per cent. on the outstanding capital. This had been divided as follows: Interest, £8171; sinking fund, £10,182; stock redemption, £538; aid of rates, £15,000; reserve fund, £6490. From the reserve had been paid the following amounts: On conveyor plant, £1270; alterations to retort-house roof, £550 12s. 9d.; lighting outside Town Hall, £301 16s. 2d.; alterations to offices and show-room, £637 12s. 2d.

The tabulated statistics following the report show that 52,800 tons of coal and cannel and 535,205 gallons of oil were used in the production of 818,689,000 cubic feet of gas, of which 753,037,400 cubic feet were sold and 762,645,900 cubic feet accounted for. The residuals produced were: Coke, 28,748 tons; tar, 3758 tons; ammoniacal liquor, 8165 tons; and sulphocyanide of ammonia, 108,126 lbs. In the production of carburetted water gas, 5739 tons of coke were used.

The Mayor (Mr. J. Fernley), in moving the adoption of the report, said the financial results of the year's working were very gratifying. He wanted to see a net profit of £20,000, or double that made in 1906, when it was £10,158. In 1907, it was £17,412; in 1908, £19,070; and this year, £21,490. It was very gratifying to the Committee and the Manager that the results were so satisfactory; and he knew that it was so to the Chairman of the Finance Committee, who required as much money as possible if the rates were to be kept at the present figure. It would be equally appreciated, he trusted, by the ratepayers, who were the owners of the works, and had, as he had said on other occasions, a right to expect a fair return upon the undertaking. Of course, he quite expected that someone would say they ought not to make any profit, but should so reduce the price of gas as to give the consumers the whole benefit. This, however, was the opinion held by only a few members of the Council. It could not be said that, as a trading undertaking, the net profit was excessive, as this year it was 8·33 per cent., against 7·43 per cent. last year, on the loans outstanding—a dividend, however, which would not be despised by any investor. It might also be said that they had reduced the quality of the gas; but this was not so to any extent.

Mr. Hollis said he thought that out of £21,000 of profit something ought to be given to the consumers. Mr. Winter (the Vice-Chairman of the Gas Committee) said it would be impossible to reduce the price of gas. If he could see that a reduction in the charge to the ordinary consumers would benefit the town, he should certainly advocate it. A concession of 1d. to 17,000 consumers seemed to be a very small amount, but it would mean a difference of £2450 per annum; and if they were to make a reduction of 2d., it would cost the Corporation £4900. An additional 1d. discount to all other than automatic consumers would cost £2260, and 2d. would bring up the amount to £4500. If they were to make a reduction of 1d. per 1000 cubic feet for lighting purposes, the cost to the Committee would be £1930; while a reduction of 2d. would cost them £3860.

Alderman Bell hoped the Committee would not listen to the suggestions made that the price of gas should be reduced. He hoped they would be determined to give as large a sum in future for the relief of the rates as they had done in the past—even more, if they possibly could—and that the Council would back them up. Mr. Lees remarked that if the rates were to be kept low, they must get as large a profit as

they could from the receiving departments. He hoped the Gas Committee would not listen to the proposals for reducing the price of gas, but would endeavour to relieve the rates as much as possible, and so encourage manufacturers to settle in the town. Alderman Lees pointed out that the high price of gas would keep manufacturers away from the town just as high rates would. The profits from the gas-works were very substantial, and, in his opinion, they had arrived at a point when the consumer should be considered. Mr. Brewster also submitted that the consumers alone should benefit by the gas undertaking, and not the whole of the ratepayers, as many of the latter did not contribute to the profit realized.

In closing the discussion, the Mayor said the gas profits could not be said to be excessive, as they only represented 3 per cent. on the total amount of capital invested in the undertaking, and only 6 per cent. on the actual capital. If they reduced the price of gas, they would advance the rates; and therefore it was for the Council to decide which was the lesser of the two evils. So long as he was Chairman of the Gas Committee, he would always hold that a fair return ought to be made on the amount of capital expended. He would not waste his time on the undertaking if he did not see a satisfactory return. It was a commercial concern in which the ratepayers had invested their money; and they had a right to have a reasonable return.

CO-PARTNERSHIP AT GRANTHAM.

At the Seventieth Ordinary Half-Yearly General Meeting of the Grantham Gas Company last Tuesday, the Directors, in their report, stated that they had arranged a co-partnership scheme with the employees, under which the latter will receive a bonus out of the profits of the Company proportional to their salaries and wages and length of employment; and this incentive to good work and continuous service the men had accepted unanimously in a most hearty and cordial spirit of co-operation. The Directors had every hope that the scheme would prove in Grantham, as experienced by other companies, a means of promoting at the same time the welfare of the men and the interests of the Company. Referring to the working of the Company in the half year, they reported a balance of £3289 17s. 7d. to the credit of the profit and loss account, and they recommended that £2000 should be applied in payment of the maximum dividend of 5 per cent. per annum on the consolidated stock, that a further sum of £500 should be placed to the credit of the reserve fund, and that the balance should be carried forward. In accordance with an announcement already made, the price of gas to the ordinary consumer is reduced from 3s. 2d. to 2s. 11d. per 1000 cubic feet as from the 1st ult. In moving the adoption of the report, the Chairman (Mr. J. G. Thompson) referred to the co-partnership scheme, and said the Directors were giving proportional bonuses to the men according to the price of gas. This was now 2s. 11d. per 1000 cubic feet, and the men earned on this at present 5 per cent. If the price of gas went down, they would earn a better bonus; but if it went up they would have less. Mr. Cox seconded the motion, and it was carried.

AUTOMATIC LAMPLIGHTING AT SOUTHAMPTON.

At the Meeting of the Southampton Town Council last Wednesday, the Works Committee reported having considered a letter from Mr. P. W. Stephens, together with the observations of the Borough Engineer thereon, relative to the trial test of the Elton-Stephens gas-lighters; and it was proposed that, the agreement not having been fulfilled in accordance with the requirements of the Borough Engineer, Messrs. R. Stephens, Sons, and Co. be asked to remove the lighters. It was moved, as an amendment, to recommend that the lighters be allowed to remain, and be hired from the Company, in accordance with the terms of the contract. The amendment was carried; and it was also carried when put as a substantive motion. Alderman Hutchens, in moving the adoption of the Committee's report, said some eight or nine months ago the Committee recommended, and the Council agreed, that a number of automatic gas-lighters should be put in two lamp-lighters' sections. The conditions were to be that the failures were not to exceed 2 per cent. Observations were made by people from both the inventors who put the system in and the Borough Engineer's office; and at the termination of the test the Borough Engineer reported that it had failed. The Committee felt that some of the failures were not provided in the contract, and that they ought to give the inventors the opportunity of hiring-out the lighters for twelve months. The Corporation did not incur any responsibility beyond the hire, and they would have a saving of one lamplighter at £60 or £70 against the hire, which would be £36; so that there would be a distinct saving. Mr. F. J. Smith, in seconding the motion, stated that the number of failures which might be attributed to the burners was less than 2 per cent. The test was carried out at a period not to the advantage of the system, which was now going on satisfactorily. Sheriff Weston contended that the proper time to try the burners was in the winter. He put the question to the Borough Engineer as to whether or not he advised the Corporation to adopt the system, and he said he did not. He (the Sheriff) proposed, as an amendment, that, the agreement not having been fulfilled in accordance with the requirements of the Borough Engineer, Messrs. Stephens, Sons, and Co. be asked to remove the lighters. The amendment was carried on a show of hands.

A small fire occurred at the works of Mr. William Edgar, at Hammersmith, on Tuesday evening last; but, fortunately, it was confined to the laboratory and testing-room, and was discovered by the night watchman on his rounds. It appears that it had been smouldering for some time, but was put out by the use of the fire-pails which hang in several parts of the works, and also with wet sand from the foundry. It was subdued before the arrival of the fire-engine, but not before the photometer was destroyed. The fire will not interfere in any way with the execution of orders.

BOURNEMOUTH PUBLIC LIGHTING.

The Economy of Automatic Controllers.

The report of the Inspectors of Public Lighting at Bournemouth for the year ended the 31st of March last has just been issued; and it must be regarded as satisfactory, as showing an increase of work at a reduction of cost. From particulars published in a local paper, we learn that there are at the present time 2214 public incandescent gas-lamps in use, including the 42 larger lamps fitted with two burners in each, and the clock at a church near the Central Railway Station, the lighting of which is paid for by the town. During the year, 108 new lamps were fixed, and the position of 53 existing lamps altered; costing in all £508 1s. 8d. There are 1272 lamps fitted with the "Gunfire" automatic controllers for lighting and extinguishing the lamps. These are maintained, mantled, and cleaned under contract by the Company. The saving effected during the year by the use of the controllers, in gas, water, and maintenance, was £332 0s. 11d. The paper says: "One can hardly expect to find the answer in the report of the officials, but the question naturally suggests itself, if a saving of £332 can be effected by the use of controllers for rather more than one-half the lamps, why are not the remainder treated in the same way, and further saving obtained? This is a matter of policy for the Lighting Committee; but the lesson suggested by their own experience is so obvious that perhaps it is only fair to assume they are only waiting for the fitting opportunity to take the proper action." The total quantity of gas consumed during the past year was 19,531,181 cubic feet, costing £2507 0s. 9d.; being at the rate of 3s. per 1000 cubic feet, less 10 per cent. discount, to the end of September, 1908, and at the rate of 2s. 9d. per 1000 cubic feet, less 10 per cent., from that time to March 31, 1909. The amount saved by the reduction in price was £135 10s. 5d.; and £102 7s. 10d. of it was spent by the Committee in extra lighting—half-an-hour each night from Oct. 31, 1908, to March 31, 1909. The cost of lighting, extinguishing, cleaning, repairing, painting, and maintenance, including Inspectors' salaries, was £2201 2s. 11d. During the twelve months, the whole of the lamps were fitted with new metallic governors, effecting a saving of £182 17s. Taking 2107 as representing the average number of lamps for the twelve months, each lamp cost £2 5s. 7d., inclusive of all charges. In 1905-6, the total expenditure was £5689 18s. 6d.; in 1906-7, it was £5300 6s. 11d.; in 1907-8, £5537 9s. 10d.; and in 1908-9 it dropped, as already shown and from the causes indicated, to £5307 18s. 6d. This is exclusive of the electric lighting.

METER AND GAS TESTING IN EDINBURGH.

The Fourth Annual Report to the Lord Provost and Magistrates of Edinburgh by Mr. William Gordon, the Official Inspector, on the working of the Corporation Gas-Meter Testing Department for the year from May 16, 1908, to May 15, 1909, has been issued. It shows that the number of meters tested during the twelve months was 87,388—14,096 wet and 73,292 dry; and fees to the sum of £2410 were collected. During the year, a visit was paid by Major MacMahon, Deputy Warden of the Standards, who expressed his satisfaction at the equipment of the department, and also at the improvement in the situation of the new central office. The question of a separate test for gas-meter indices has been under the Inspector's notice for a considerable period. The subject is an important one, though it is undeniable that the extraordinary care now shown, and the accuracy attained, in the manufacture of gas-meter mechanism greatly minimizes the necessity for interference by the Legislature. In Edinburgh, the gas consumers have not manifested any anxiety to have the indices of their meters tested separately. The expenditure incurred in carrying out an index test would be very great, and the fees received quite inadequate to reimburse the department. The benefit gained by gas consumers—who would, of course, have to pay for the innovation—would be infinitesimal. It should be borne in mind by those who from time to time advocate the laying down of special plant for testing indices, that gas is the only illuminant supplied to consumers through instruments which are officially tested for accuracy of measurement under conditions as prescribed by Act of Parliament. The total number of meters tested by the department since its institution in 1861, up to and including the 15th of May last, amounts to 2,340,644; the fees received for the same period being £68,875. Figures are given showing the number of automatic meters, new and repaired, tested and examined during the twelve months. It is interesting to note that the output of coin-in-the-slot meters exceeds that of the ordinary type by 2407. This is a striking testimony to the popularity of the method of "selling gas by the pennyworth." The cash statement shows that there was a profit of £1019 on the year's work. Besides the central testing-station in the City Chambers, there are public testing-stations in other parts of Edinburgh. The staff employed is one Chief Inspector and six inspectors.

Of the 73,292 dry meters tested, 764, equal to 1·04 per cent., were rejected as incorrect. Of the 14,096 wet meters tested, 34, or 0·24 per cent., were rejected for a like reason. There were 80,533 meters of from one to five lights tested, at 6d. each; 6498 of from 10 to 60 lights, at 1s. each; 170 of 80 and 100 lights, at 2s. each; 58 at 3s.; 32 at 4s.; 38 at 5s.; 12 at 6s.; 15 at 7s.; 7 at 8s.; 5 at 9s.; 4 at 10s.; 6 at 12s.; 2 at 14s.; one at 15s.; 2 at 16s.; and one each at 18s., 20s., 25s., 30s., and 36s. The number of new automatic meters tested was 36,212, and of repaired meters 8213. The number of new ordinary meters tested was 33,805, and of those repaired 8277. The ordinary meters tested "for certificate" numbered 431.

As instructed by the Town Council, and in compliance with the Edinburgh and Leith Corporations Gas Order Confirmation Act, 1908, which authorized the installation of an official testing-station in the City Chambers, a 60-inch Letheby-Bunsen standard photometer was erected for the purpose of testing the illuminating power of the gas. The photometer room is 19 feet long, 12 feet wide, and 13 feet high; its capacity being 3087 cubic feet. The size of the apartment allows of good ventilation; and, owing to the system of heating, a fairly constant temperature can be maintained during testing operations. The

instrument is constructed to test burners up to 300-candle power; but with the aid of a Simmance-Abady "Flicker" head, and an arrangement which they have devised, they will be able to accurately determine the consumption and illuminating efficiency of any type of high-power burner which may be required in the Corporation properties where gas is consumed. On Monday, Dec. 21, 1908, the Edinburgh and Leith Gas Commissioners' Provisional Order was duly confirmed; and since that date the work of testing for illuminating power has been carried on continuously. The minimum is fixed by Statute at 14 candles, when measured with a "Metropolitan" No. 2 argand burner, consuming 5 cubic feet of gas per hour. The standard of light is a Harcourt 10-candle pentane lamp. As can be seen by the perusal of the weekly readings forwarded to the Town Clerk, the Inspector has carried out daily tests at various hours, chosen at his own discretion, and without any previous intimation to the Gas Commissioners of his intentions. From Dec. 22, 1908, to May 15, 1909, the average illuminating power of the gas, as read at the City Chambers, equalled 18·65 candles. All the tests were carried out under conditions prescribed by the Metropolitan Gas Referees.

THE EXPLOSION AT THE HANLEY GAS-WORKS.

Inquest on a Victim.

At the North Staffordshire Infirmary, Stoke-on-Trent, a few days ago, an inquest was held by Mr. Hugh W. Adams, County Coroner, in regard to the death of Patrick Sharkey, aged 62 years, who had succumbed to injuries sustained at an explosion at the Etruria works of the British Gaslight Company on the 19th ult., as recorded in the "JOURNAL" a fortnight ago (p. 267). Mr. J. R. Heath, the Engineer and Manager of the station, and Mr. E. A. Ashmall, solicitor, were present on behalf of the Company; Mr. J. A. Redgrave, one of the Superintending Inspectors of Factories, and Mr. Sydney Shuter, the Inspector for the Potteries district, were also present.

Michael Morgan, the purifier foreman at the works, stated that the accident happened about 7.30 in the morning. Deceased and several other men were engaged in emptying an oxide of iron purifier, measuring 40 ft. by 35 ft. The usual way of doing this was to take out the contents with spades; but sometimes picks were employed if the material was hard. On this particular occasion they were being used. All of a sudden there was an explosion—the only suggestion for which was that one of the picks had struck the side of the purifier, thus causing a spark. He at first shut off the gas, so that none could pass into the purifier. He had had 32 years' experience in this work. The purifier was last emptied in March, and was filled again. He was quite satisfied that there was not the slightest escape of gas. All the purifiers at the works were in the open air; and he had not known anything like this to happen before. The valves were in order, as far as he could see; and there was no leakage.

Asked if he had any suggestions to make, Mr. Redgrave said he did not know if Mr. Heath considered half-an-hour's exposure to the open, from the time of taking off the cover of the purifier to the time when the men entered it, was sufficient. Mr. Heath said he considered the exposure allowed for the clearing of the gas quite sufficient; and they followed the same course as that adopted all over the country. He further suggested that the probability was that a longer exposure would cause a larger quantity of air to mingle with the gas, and the mixture would then become more explosive. Mr. Redgrave remarked that in this case the purifiers were all out in the open air. He should not consider the time sufficient if they were confined in the old purifier-houses.

The Jury returned a verdict "That the death of the deceased Patrick Sharkey was due to shock following burns as the result of an explosion while emptying a purifier at the gas-works."

GAS v. ELECTRICITY IN FINCHLEY.

The District Council and the Local Government Board.

One of the Assistant Secretaries of the Local Government Board has written to the Finchley Urban District Council with respect to their application for sanction to a loan of £2200 for purposes of arc lighting. The Board referred the Council to their letter of Aug. 31, 1905, in which they suggested that, in connection with any future proposals for public lighting by electricity, the Council should carefully consider the cost as compared with that of lighting by gas, and inquired whether the suggestion was brought before the Council, and whether consideration was given to it before the present proposal was adopted. In conclusion, the Board asked for any reports made on the subject, and a copy of any estimate of the comparative cost of the two methods of lighting which may have been submitted to the Council or to the Highways and Lighting Committee. The Council directed the Clerk (Mr. E. H. Lister) to reply that the suggestion contained in the Board's letter of Aug. 31, 1905, was duly reported to the Finance Committee; and the result of its consideration by a Joint Committee of the Highways and Lighting Committee was a report which led the Council to decide to adhere to the electric lighting of the streets, where this was available, and in other cases to use incandescent gas. With regard to the present application, the Clerk said the Council had had under consideration the question of lighting the streets with gas, and, on the report of the Highways Committee, determined that they could not adopt a system of gas lighting in the roads specially indicated. The Board would therefore see that in 1905 and 1908 the Council had the question before them, and on both occasions decided that they could not adopt gas lighting for the streets. With regard to the last paragraph of the Board's letter, the Clerk said the Surveyor to the Council, at the request of the Highways Committee, asked the Manager of the North Middlesex Gas Company to supply him with an estimate for gas-lamps of the same candle power as the proposed arc lamps, or, if unable to do so, to submit an alternative suggestion for the lighting of the roads with such gas-lamps as they thought advisable; and he was informed that the Company were not prepared to supply an estimate simply to enable the Council to compare gas lighting with electricity. The Surveyor informed him that any such estimate would be fully and carefully considered by the Council. As to the question of the illuminant to be used for the streets, the Clerk said the Council considered they were the best judges of the matter, and did not feel that they could submit to any outside pressure to force upon them an illuminant of which they did not approve, and which, in their opinion, was not so satisfactory for the present purpose as the one they proposed. They respectfully submitted that the point the Board was called upon to decide was whether a loan should be granted for the necessary sum to enable arc lighting to be installed, and not as to whether gas or electricity should be used.

LIGHTING AND WATER SUPPLY OF DURHAM.

The First Annual General Meeting of the Institution of Municipal Engineers—the formation of which about a year ago was noticed in the "JOURNAL" at the time—was held in the Town Hall, Durham, last Saturday, under the presidency of Mr. JOHN T. PEGGE, the City Engineer and Surveyor, who read an interesting paper on the municipal history and works of Durham. We have received from the Secretary (Mr. B. Wyand) a print of the paper, and extract from it the portions of special interest to our readers.

Lighting.

The Coronation of George III. was celebrated by the inhabitants of the city placing rushlights and candles in their house windows; and these and the time-honoured lanthorn appear to have been the only means of illumination after sunset. Naturally the idle youth, vagrants, burglars, garotters, and other like evil-doers, must have had a rich harvest and happy time, if one judges from the local "Durham County Advertiser," from whose issues I have culled many facts. The Mayor of Durham held his court-leet and court-baron in 1814; and a public meeting was afterwards held to consider the riotous conduct in the Elvets, Baileys, and South Streets after dark. As a result of this, the Commissioners decided to put lamps in the streets. These were to be lighted from Sept. 21 to April 3, and provided with best whale oil and cotton wicks, to burn with a full, clear light from sunset to sunrise, except during the five nights before and two nights after each full moon. The lamps, however, were continually broken.

Early in 1823, a public meeting was held to take into consideration the lighting of the city and the borough of Framwellgate with coal gas; "and Mr. West (who has recently lighted Stockton, Richmond, &c.) is to carry out the intentions of the Commissioners before next winter." This was accomplished, for it is recorded on Jan. 2, 1824:

> The city was partially lighted by coal gas on Saturday and Sunday last, and wholly on Monday evening. The change which this substitute of gas for oil has effected is perfectly surprising, for we behold a city long notorious for its nocturnal darkness become at once perhaps one of the very best lighted towns in the kingdom. The street lamps are placed much nearer than is usual in most towns; and this, added to the brilliance of the lights, completely fills our narrow streets. A band of music paraded the streets, and the church bells rang a merry peal in compliment to Mr. West, who has at his sole expense erected the works, laid the pipes, and provided the lamps, engaging to light the town for the same sum that the lighting with oil has cost. The usual charge for gas in towns possessing local advantages as Durham is from £2 10s. to £2 12s. 6d. per lamp for the season; but Mr. West has contracted for less than £1 4s.—he supplying all pipes, pillars, services, &c., usually paid for by the Commissioners of other towns. Thus Durham has exchanged a light barely sufficient to render darkness visible for one of great beauty and brilliancy without having been at one farthing expense.

In 1841, the first Gas Company was formed; the undertaking being purchased from Mr. West by gentlemen who were all members of the Corporation, and the vendor quite expected it was being sold to the city. An opposition Company was commenced—the Coal Gas Consumers' Supply Company; but it was eventually merged in the above Company, and the whole concern transferred to the present Company in 1873. They extended the works and the area of supply, which is now as follows: Area of supply, about 33 square miles; houses supplied, 4507; gas made in 1908, 126,398,000 cubic feet; gas sold, 100,610,000 cubic feet. There is a special carburetted water-gas plant, by Messrs. Humphreys and Glasgow, of a capacity of 200,000 cubic feet per day. The price of gas is 2s. 9d. to 3s. per 1000 cubic feet, according to the quantity used. The Company can charge 1s. per 1000 feet extra for outer districts; but they only charge 3d. The greatest difficulty over practically the whole area is caused by subsidences due to colliery workings. The Company also have a sulphate of ammonia plant. At the end of 1908 there were 1148 gas cookers and heaters out on hire, notwithstanding the fact that so many residents have their coal supplied free. Up to the year 1902, the city had been lighted by flat-flame burners; one-half of the lamps being extinguished at midnight from October to April, and three-quarters extinguished altogether from May to August. The number of lamps was then 285 5-feet and ten 10-feet burners; and the amount paid per 5-feet lamp was £3 4s. per annum. The Company met us very fairly, and agreed to convert all lamps into incandescent-burner lamps within a stated time, and to provide all lighting and upkeep as before and mantles—the lamps to be all lighted throughout the year from sunset to sunrise (but one-half to be extinguished at 11.30 p.m.), at a cost of £3 0s. 6d. per lamp per annum. Including the newly-added area, there are now—

360 ordinary burners, consuming about 3½ cubic feet per hour, 60 to 80 yards apart	each	£3	0	9
10 four-burner lamps, special Welsbach	each	16	10	0
2 public clocks	each	16	0	0
3 special single-burner high-pressure lamps in Market Place	each	16	18	0

These charges include all maintenance, attention, and replacements of every kind.

Early in 1901, the Council leased their powers for 21 years to the

Durham District Electricity Company, and this Company's interests were taken up by the County of Durham Electric Power Distribution Company, having their generating station at Carville-on-Tyne, near the source of the coal supply. There is a transforming station just outside the city on the north, from which the current is supplied to the Durham station. The pressure of supply in the city is on the three-wire system, at 240 volts for lighting and 480 volts for power; and all motors above 1 H.P. have to be connected across the outers. The number of connections to the Company's mains in Durham is about 500. The tariffs are—

Lighting, 3¾d. per unit, less 5 per cent. discount.		
Motive power, 1000 units per quarter . . .		1·50d. per unit.
Next 50,000	,, ,, ,, ...	1·25d. ,, ,,
,, 50,000	,, ,, ,, ...	1·00d. ,, ,,
,, 50,000	,, ,, ,, ...	0·75d. ,, ,,
Heating radiators, 1½d. per unit, if on separate circuit and meter.		

Water Supply.

A supply of water was put into the Market Place in 1450; the pipes being in 3-feet lengths, seamed, butt-jointed, and burnt and tafted ends; the lead used being virgin lead, containing silver, from the Bishop's mines in Weardale, some of which are unearthed from time to time. In 1818, the water supply in the Market Place being bad, and the fountain and its pipes being out of working order, it was proposed to fix two pumps on each of the two bridges "where the public could get pure and wholesome water." Considering that some 25 to 30 old stone drains and sewers emptied into the river above these points, probably the townspeople thought quite otherwise. Colliery workings, various sources of pollution, the gradual filling-up of graveyards, &c., notwithstanding, these supplies continued in use till 1844, when the Durham Water Company erected works just outside the south-east corner of the city, with pumps and a service reservoir on Mountjoy Hill near. The city received a supply of filtered river water until 1880; Messrs. T. & C. Hawksley being the Consulting Engineers. The Company was taken over by the Weardale and Shildon (now the Weardale and Consett) Water Company, for whom the firm still act in a consultative capacity.* The Durham area of supply is, roughly speaking, somewhere about 50 square miles, with a total population of 100,000 persons. There are no great difficulties of supply except those due to colliery workings, subsidences, and occasional anxiety owing to districts being isolated. But repairs can now be done under pressure; and, owing to the system of duplicate pipe-lines, most of the districts are not without water for long. The consumption for domestic purposes is about 10 gallons per head. The water charges are 7½ per cent. on the rack-rents, and 7d. to 2s. per 1000 gallons through meter, according to the quantity used; baths and water-closets being charged for in addition. The highest pressure in the city is 160 lbs.; the lowest, 30 lbs. This constant and cheap supply of a soft, pure water, though of a slightly peaty colour, has an important bearing on the health of the inhabitants, most of whom are underground workers.

* A description of the Company's works, by the Engineer (Mr. R. Askwith, M.Inst.C.E.), prepared for the recent visit of the Association of Water Engineers, will be found in the "JOURNAL" for June 15 (p. 725).—ED. J.G.L.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The annual accounts of the Glasgow Corporation Gas Department were submitted to the Town Council on Thursday, and were adopted, though not without opposition. They show a considerable decline in business, which is attributed by the Gas Committee to depression in trade and the more general use of incandescent burners. With the second of these reasons I am disposed to agree; but not with the first. That the general use of the incandescent burner is limiting the demand for gas there can be no doubt; and no one grudges that it should be so, because of the stability which such a tendency gives to the business of gas supply. As to depression in trade, the expression is one which is easily spoken; but where is the evidence of it? Depression in trade, to have affected the gas business, would mean inability on the part of the people to pay. What I find, however, is that gas consumers in Glasgow have paid their bills better last year than they did the year before. The sum of gas-rents to be recovered at present is stated at £92,654, which is £22,881 less than it was a year ago. There are other reasons, of a more permanent nature, which affect the demand for gas, and not only the demand for gas, but the general wellbeing of many citizens. One is the rapid extinction of the small shopkeeper class, who are being ousted by co-operative and other large commercial establishments, whereby economy in the distribution of commodities is effected. There is another reason, which is more particular to Glasgow, and which was referred to in the Town Council in the statement that thousands were leaving the city. The meaning of this expression was that, with the cheapened facilities for transit which are provided by the tramway service, thousands of citizens are making their residences outside the city, where taxation is lighter. The week-end railway services are also responsible for a large decrease in the demand for gas; there being now many dwellings in which no light is required upon the Saturday and Sunday evenings. There is, of course, to be set against these causes of decline the natural growth of the city, which may be relied upon, in general, to counteract the contrary influences. The reflection naturally comes up that it is time the Gas Committee were applying their minds to the problem of extending the area of the gas supply, so as to include as much as possible of the districts favoured by tramway travellers, which, if legislation were necessary, might be made part of the Bill that is proposed for next year. We sometimes hear reductions in the price of gas lauded on the ground that they mean a gift to the community of so many thousand pounds. So they are; and in the same light, when it is considered that the revenue of the Gas Department was less than it was a year ago by over £140,000, it may be said that

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 372.

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Apl. 16	10	Alliance & Dublin 10 p.c.	17⅞–18⅛	..	5 9 7
298,955	10	'	7	Do. 7 p.c.	12⅞–13	..	5 7 8
310,000	Stk.	July 14	4	Do. 4 p.c. Deb.	96–98	..	4 0 0
200,000	5	May 27	6½	Bombay, Ltd.	5⅞–6⅛	..	5 10 8
40,000	5	'	6½	Do. New, £4 paid .	4⅞–4⅞	..	5 12 5
50,000	10	Feb. 25	14	Bourne-) 10 p.c. . .	28½–29½	..	4 15 9
51,810	10	,,	7	mouth Gas) B 7 p.c. .	16½–17½	..	4 1 2
53,200	10	,,	6	and Water) Pref. 6 p.c.	15⅝–15⅞	..	3 15 7
380,000	Stk.	,,	12½	Brentford Consolidated	254–257	..	4 17 3
300,000	,,	,,	5½	Do. New . . .	195–197	..	4 16 5
50,000	,,	,,	5	Do. 5 p.c. Pref. .	122–124	..	4 0 8
206,250	,,	June 11	4	Do. 4 p.c. Deb. .	100–102	..	3 18 5
220,000	Stk.	Mar. 12	10⅝	Brighton & Hove Orig.	212–214	..	5 0 6
246,320	,,	,,	7½	Do. A Ord. Stk. .	154–156	..	4 19 4
460,000	20	Apl. 16	10	British	43–43½	..	4 11 11
109,000	Stk.	Feb. 25	6	Bromley, A 5 p.c. . .	119–121	..	4 19 2
165,700	,,	,,	4½	Do. B 3½ p.c. . .	89–91	..	4 18 11
82,278	,,	,,	5½	Do. C 5 p.c. . .	108–110	..	5 0 0
51,000	,,	June 25	3½	Do. 3½ p.c. Deb. .	88–90	..	3 17 9
500,000	10	May 13	7	Buenos Ayres (New) Ltd.	13½–14	..	5 0 0
250,000	Stk.	June 25	4	Do. 4 p.c. Deb. .	94–96	..	4 3 4
100,000	10	—	—	Cape Town & Dis., Ltd.	4½–5	..	—
100,000	10	—	—	Do. 4½ p.c. Pref. .	5½–6	..	—
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	48½–49½	..	6 1 3
100,000	Stk.	June 25	4½	Do. 4½ p.c. Deb. Stk.	82 84	..	5 7 2
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord. . .	109–111	..	4 10 1
1,493,280	Stk.	Mar. 12	5 5/16	Commercial 4 p.c. Stk. .	108–110	..	4 14 6
560,000	,,	,,	5	Do. 3½ p.c. do. .	104–106	..	4 14 4
475,000	,,	June 11	3	Do. 3 p.c. Deb. Stk.	81–83	..	3 12 3
800,000	Stk.	,,	5	Continental Union, Ltd.	96–98	..	5 2 0
200,000	,,	,,	7	Do. 7 p.c. Pref.	138–140	..	5 0 0
493,270	Stk.	—	5	Derby Con. Stk. . . .	121–123	..	4 1 4
55,000	,,	—	4	Do. Deb. Stk. . . .	103–105	..	3 16 2
145,995	,,	Mar. 31	5	East Hull 5 p.c. Ord. .	100–102	..	4 18 0
486,690	10	July 14	12	European, Ltd. . . .	24½–24¾	..	4 17 0
354,660	10	,,	12	Do. £7 10s. paid.	8½–8¾	..	4 16 0
15,141,545	Stk.	Feb. 11	4⅜†	Gas) 4 p.c. Ord. . .	105–106	+¾	4 8 0
2,620,000	,,	,,	3½	light) 3½ p.c. max. .	88–90	..	3 17 9
3,799,735	,,	,,	4	and) 4 p.c. Con. Pref.	105–107	..	3 14 9
4,193,975	,,	June 11	3	Coke) 3 p.c. Con. Deb.	55½–56½	..	3 9 4
258,740	Stk.	Mar. 12	2½	Hastings & St. L. 3½ p.c.	93–95	..	5 0 0
82,500	,,	,,	6½	Do. do. 5 p.c	118–120	..	5 4 2
70,000	10	Apl 29	11	Hongkong & China, Ltd.	17⅞–18⅛	+⅛	6 0 7
123,5 0	Stk.	Mar. 12	6½	Ilford A and C . . .	141–143	..	4 10 11
65,781	,,	,,	5	Do. B	106–108	..	4 12 7
63,000	,,	June 25	4	Do. 4 p.c. Deb. . .	102–104	..	3 16 11
4,940,000	Stk.	May 13	8	Imperial Continental .	179–181	..	4 8 5
473,600	Stk.	Feb. 11	3½	Do. 3½ p.c. Deb. Red.	95–97	..	3 12 2

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
195,242	Stk.	Mar. 12	6	Lea Bridge Ord. 5 p.c. .	120–122	..	4 18 4
561,000	Stk.	Feb. 25	10	Liverpool United A .	226–228	..	4 7 9
718,100	,,	,,	7	Do. B .	168–170	..	4 2 4
306 083	,,	June 25	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 11	6	Malta & Mediterranean	4⅞–5⅛	..	5 17 1
500,000	100	Apl. 1	5	Met of) 5 p.c. Deb	101–103	+1	4 17 1
250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	101–103	..	4 7 5
541,920	20	May 27	3½	Monte Vid o Ltd. .	12½–13	..	5 7 8
1,775,892	Stk.	July 29	4⅜	Newc't e & G't sh'd Con.	10 5/8–10 6/8*	..	4 4 6
518,795	Stk.	June 25	3½	Do. 3½ p.c. Deb.	91–93	..	3 15 3
15,000	10	Feb. 25	10	North Middlesex 10 p.c.	19½–20	..	5 0 0
55,940	10	,,	7	Do. 7 p c	13–13½	..	5 3 8
300,000	Stk.	Apl. 29	8	Oriental, Ltd. . . .	137–139	..	5 15 1
60,000	5	Mar. 31	8	Ottoman, Ltd. . . .	1⅛–1⅜	..	6 5 6
31,800	53	Feb. 25	13	Portsea Island A. . .	140–142	..	4 16 11
60,000	50	,,	13	Do. B. . .	132–134	..	4 17 0
100,000	50	,,	12	Do. C. . .	123–125	..	4 16 0
114,800	50	,,	10	Do. D and E.	103–105	..	4 15 3
398,490	5	May 13	7	Primitiva Ord. . . .	7–7⅛	+⅛	4 16 7
796,580	5	July 29	5	Do. 5 p.c Pref. .	5⅛–5⅜*	..	4 10 10
488,902	100	June 1	4	Do. 4 p.c Deb. .	91–96	..	4 3 4
1,500,000	10	Apl 29	8	River Plate Ord. . .	16⅞–17⅛	+1	4 12 9
312,650	Stk	June 25	4	Do. 4 p.c. Deb. .	96–98	..	4 1 8
250,000	10	Mar. 31	8	San Paulo, Ltd. . . .	4–14⅜	..	5 10 4
62,500	10	,,	6	Do. 6 p.c. Pref. .	12–12⅜	..	4 16 0
125,000	50	July 1	5	Do. 5 p.c. Deb. .	49½–50½	..	4 19 0
135,000	Stk.	Mar. 12	10	Sheffield A	236–238	..	4 4 0
2(9,981	,,	,,	10	Do. B	233–235	..	4 5 1
523,500	,,	,,	10	Do. C	233–235	..	4 5 1
50,000	10	June 11	10	South African	13½–14	..	7 2 10
6,429,895	Stk.	Feb 11	5/6/8	South Met., 4 p.c. Ord.	121–123	−1	4 6 8
1,895,445	,,	July 14	3	Do. 3 p.c. Deb.	84½–85½	..	3 10 2
209,820	Stk.	Mar. 12	8	South Shields Con. Stk.	153–155	..	5 3 3
605,000	Stk.	Feb. 25	5½	S'th Suburb'n Ord. 5 p.c.	120–122	..	4 10 2
60.000	,,	,,	5	Do. 5 p.c. Pref. . .	122–124	..	4 0 8
117,078	,,	July 14	5	Do. 5 p.c. Deb. Stk.	122–124	..	4 0 8
502,310	Stk.	May 13	5	Southampton Ord. . .	110–112	..	4 9 3
120,000	Stk.	Feb. 25	6⅜†	Tottenham) A 5 p.c. .	132–134	..	5 2 7
453.940	,,	,,	5⅜†	and) B 3½ p.c. .	111–113	..	4 15 1
149.470	,,	June 25	4	Edmonton) 4 p.c. Deb.	100–102	+1	3 18 5
182,380	10	June 11	8	Tuscan, Ltd.	9–9⅜	..	8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	99–101	..	4 19 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p.c. max.	111–113	..	4 8 6
255,6 6	Stk.	Feb. 25	6⅜†	Wands-) B 3½ p.c. .	139–141	..	4 9 3
79,416	,,	June 25	3	worth) 3 p.c. Deb. Stk.	73–75	..	4 12 2
895,872	,,	Feb. 25	5⅜†	West Ham 5 p.c. Ord. .	125–127	+2	4 0 0
210,000	,,	,,	5	Do. 5 p.c. Pref. .	120–128	..	4 4 8
253,300	,,	June 25	4	Do. 4 p.c. Deb. Stk..	105–107	..	3 18 2

Prices marked * are "Ex div." † Next dividend will be at this rate. 3 14 9

this money, being left in the pockets of the citizens, meant a gift of this amount to them. Yet the citizens never felt that they were receiving such a gift. This brings out the paltry nature of the opposition to the accounts, the foundation for which was a desire to gain £3600 for the public lighting—an irregular method of subsidizing the rates. A good deal was said in the discussion upon the accounts about irregularities on the part of the Gas Committee; but this was merely a side issue attached to the main issue for the purpose of catching votes. The Council would not listen to the special pleadings of the critics, notwithstanding that they had support in high quarters, but adopted the accounts straight off. Not only the Council, but the citizens are satisfied that the Gas Department is being well conducted, and conducted in the interests of all. For proof of this, there is need to go no further than to point to the price of gas, which, with the reduction to 2s. per 1000 cubic feet now made, is being sold at a lower figure than it has ever yet been; and there is every prospect, now that cheap coal has been, it may be assumed, assured for some years, that the low price will be a maintainable one.

The gas transfer at Carnoustie is being proceeded with in an exceedingly methodical manner. In the "JOURNAL" for July 20, it was stated in these "Notes" that a conference had taken place between representatives of the Gas Company, the Town Council, and the ratepayers—the last named having been appointed at a public meeting; and that at the conference the representatives of the Town Council agreed that they would recommend that £19,000 be offered for the Company's undertaking. A week later, it was stated that the Town Council ratified this recommendation. Now it falls to me to report that on Thursday evening the representatives of the ratepayers met their constituents in public meeting to give an account of what they had done. Ex-Bailie Ferrier, who was called to the chair, expressed himself as not clear in his own mind whether the community should acquire the gas-works or not, unless they could get them at what he would call a reasonable figure. It was an important question for the burgh, because, if they made a mistake at this stage, it would mean a pretty heavy burden for years to come. The three representatives of the ratepayers then stated their views. Mr. J. Nicoll severely criticized the report made by Mr. A. Silverthorne (who recommended the Town Council to offer £16,000 for the undertaking). Mr. Nicoll said that he had visited the gas-works, and they were not a "rotten show," as they had been described (he did not say by Mr. Silverthorne), but were a "splendid show." He had good grounds for his view that the Town Council should offer £20,000, which he considered a fair sum. Mr. R. Matthewson, another representative, considered that Mr. Silverthorne had made an underestimate throughout, and had put the matter before the ratepayers in such a manner that no right-thinking or fair-minded body of men, such as the Gas Directors, would agree to discuss it. He himself had gone over the gas-works, and they could produce gas, after a period of ten years, at the same price, or at an equal price, to that charged by the Company, even although the Town Council paid up to £21,000. Ex-Provost Soutar, on behalf of the Town Council, upheld the report of Mr. Silverthorne as an honest, straightforward statement, and as having nothing false in it. The Chairman said his original idea was that the purchase price should be £19,000; but Mr. Nicoll had gone into the matter so thoroughly that he had brought him round to his figure as being a fair and reasonable sum. Mr. A. Duncan said he was prepared to move that the meeting agree to the sum of £20,000 as the purchase price; but he thought the more practical way was to take a plebiscite of the people themselves. He accordingly moved that the necessary requisition be got up and presented to the Town Council, asking for a plebiscite to be taken. This was unanimously agreed to; and the ratepayers' representatives were thanked for their reports.

At a special meeting of the Inverness Town Council held last week for the consideration of the estimates of revenue and expenditure for the year, Treasurer Duncan Macpherson said that the Finance Committee agreed to the recommendation of the Gas-Works Committee that those who used prepayment meters should in future be supplied with gas at the same rate as other consumers, which, it was expected, would entail a loss of about £200. The estimated revenue was £17,165, and the estimated expenditure, £17,860, which would leave a deficit of £695, all of which is to be made good out of the surplus fund at the credit of the profit and loss account.

Birnam having been declared, by decision of the Sheriff of Perthshire, a special lighting district, the first meeting of the Committee in charge was held last Saturday. The Clerk reported that they were too late for the imposition of a rate for last year. Letters from the former private Lighting Committee were submitted, in which they handed over the street-lamps to the Committee. Arrangements were approved for the placing of 11 old and 15 new lamps, at a cost of £100—an expenditure which it was resolved to spread over three years. The annual cost of lighting is estimated at £40. The Committee agreed to impose a rate of 5d. in the pound, which will realize £86. It is intended that the Dunkeld Gas Company will erect the lamps; and the Committee understand that the former annual charge of 17s. 6d. per lamp will be continued.

The annual meeting of the Crieff Gaslight Company, Limited, was held last week—Dr. T. H. Meikle presiding. A dividend of 7½ per cent. was declared (the same as for the previous year); and it was resolved to continue the price at 3s. 9d. per 1000 cubic feet. There has been a considerable increase in the consumption of gas during the past year, following the supplying and fitting up, by the Company, of 906 gas-cooking appliances.

An explosion of gas of a nature which it is surprising there are not more of occurred in an unoccupied house at 83, Taylor Street, in the Townhead district of Glasgow, last Sunday evening. The house is on the ground floor, and adjoins the premises of a licensed grocer. Two constables, surmising that there were burglars in the house, entered it. One of them turned his lantern on in the passage, when there was a violent explosion, which severely burned one of the policemen, and blew out all the windows of the house and the street door off its hinges. No one was found on the premises; but it was evident that an attempt had

NOTICE.

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THE BLAND LIGHT SYNDICATE, Ltd., 63, QUEEN VICTORIA ST., LONDON, E.C., & 20, FENNEL ST., MANCHESTER.

been made to break through the wall into the grocer's shop. In this attempt a gas-pipe had been cut, which probably led the housebreakers to cease their work and retire before the police arrived.

In the Grangemouth Town Council on Monday, the Burgh Chamberlain submitted his annual statement regarding the finances of the Corporation. Dealing with the Gas Department, it was stated that the revenue for the past year was £6454, against which there was an outlay of £6578, which included a contribution of £800 to the sinking fund. It would be necessary to encroach on the surplus from the previous year to the extent of £124. The reduced contract price for coal, it was considered, may provide sufficient margin to meet the expenditure during the current year; but, in the opinion of the Chamberlain, it was obvious that the price of gas could not be lowered at present. The Chamberlain's statement of accounts was approved, and authority given to sign it.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 7.

Sulphate of Ammonia.

There has been no new feature in the market upon which to comment. Demand has been fairly steady, and, production being now at its minimum, prices have been about maintained. The closing quotations are £11 1s. 3d. per ton f.o.b. Hull, £11 3s. 9d. per ton f.o.b. Liverpool, and £11 5s. per ton f.o.b. Leith. Some business is being done over near months at but a slight premium on spot prices; but for delivery farther ahead the prices required by makers are not obtainable. For August-December £11 7s. 6d., for October-March £11 10s., and for January-June £11 12s. 6d. per ton are the quotations.

Nitrate of Soda.

This article continues very quiet; but the quotations are unchanged at 9s. 9d. per cwt. for ordinary, and 10s. for refined quality, less 2½ per cent.

LONDON, *Aug.* 9.

Tar Products.

The markets for tar products remain practically without change. Pitch is firm, and rather better prices are reported to have been paid for forward delivery. Benzols are steady, with a fair demand for 90's. Toluol is firm; but there are no fresh inquiries. Crude carbolic is decidedly easy, and Continental buyers report having purchased at 10⅜d. to 11d. Creosote is steady; but not many fresh sales are reported.

The average values during the week were: Tar, 16s. to 20s. Pitch, London, 29s. to 29s. 6d.; east coast, 28s. 9d. to 29s. 3d.; west coast, 28s. 3d. to 29s. 3d. f.a.s. Mersey ports, 28s. to 28s. 6d. f.o.b. other ports. Benzol, 90 per cent., casks included, London, 6½d. to 6⅝d.; North, 6d. to 6¼d.; 50-90 per cent., casks included, London, 7d. to 7¼d.; North, 6⅝d. to 7d. Toluol, casks included, London, 8¼d. to 8½d.; North, 7⅞d. to 8d. Crude naphtha, in bulk, London, 3¼d. to 3½d.; North, 3d. to 3¼d.; solvent naphtha, casks included, London, 10⅜d. to 11d.; North, 9⅜d. to 10d.; heavy naphtha, casks included, London, 10½d. to 10⅝d.; North, 9½d. to 9⅝d. Creosote, in bulk, London, 2⅜d. to 2 11/16d.; North, 2½d. to 2⅝d. Heavy oils, in bulk, 2⅝d. to 3d. Carbolic acid, 60 per cent., casks included, east coast, 10⅜d. to 11d.; west coast, 10¼d. to 10⅜d. Naphthalene, £4 10s. to £8 10s.; salts, 37s. 6d. to 40s., packages included and f.o.b. Anthracene, "A" quality, 1¼d. to 1⅜d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article is quiet, and very little fresh inquiry is reported from any quarter. Beckton prompt is £11 7s. 6d., and ordinary makes on Beckton terms are about £10 18s. 9d. to £11. In Hull, the price is £10 18s. 9d. to £11; and in Liverpool, £11 2s. 6d. In Leith, £11 5s. to £11 6s. 3d. is quoted.

COAL TRADE REPORTS.

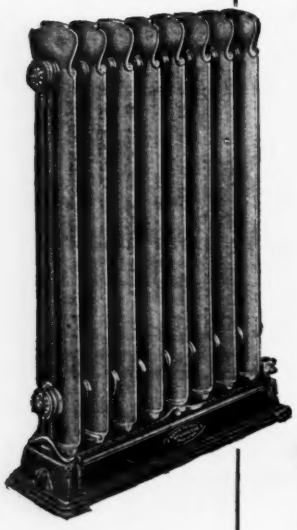
Northern Coal Trade.

There is now a general return to normal conditions in the Northern coal trade, though there is still some limitation of the production through local strikes. In the steam coal branch, the demand is fairly good; but for best kinds, there is some scarcity, owing to one of the chief collieries having been idle some days. Best Northumbrian steams are now quoted from 12s. 9d. to 13s. per ton f.o.b., second-class steams are 11s., and steam smalls are steady at from 5s. 3d. to 6s. 3d. Exports are fairly good; but the slight interruption above referred to influences the quantities sent from some of the ports. In the gas coal trade, the demand is full especially for best sorts, and there is some pressure for these classes for the Mediterranean ports. Durham gas coals vary in price from about 10s. to 11s. per ton f.o.b., for the usual classes, and up to 11s. 6d. for "Wear specials." A contract for 16,000 tons for Magona is reported—the price being stated as about 16s. 6d., delivered at Porto Vecchio. The collieries appear to have their output well taken up, though some of the gas companies have added to their stocks of late. There is a steady demand for coke; and good gas coke is from about 12s. 9d. to 13s. per ton f.o.b. in the Tyne—the production showing some increase.

Scotch Coal Trade.

By the settlement of the dispute in the coal trade, a great impetus will be given to trade, though in many individual instances doubtless speculators will be hardly hit by the prices not going up. The trade was so disorganized by anticipation of a strike that it will take some time before it settles down. Prices are expected to fall lower than they are; and this expectation, coupled with the fact that large stocks have been laid in, has a restrictive effect upon buying. The prices are: Ell 10s. 6d. to 11s. 3d., splint 11s. to 11s. 3d., and steam 9s. 3d.

TRIBUTES of MERIT



PAID by enthusiastic users of DAVIS'S PATENT STEAMLESS RADIATOR will from time to time appear on this page, to demonstrate what a weight of competent authority it has on its side to commend it for any and every scheme of Heating which will come up for consideration during the next few months.

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THE DAVIS GAS STOVE COMPANY, LTD.,
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to 9s. 6d. per ton f.o.b. Glasgow. The shipments for the week amounted to 213,026 tons, an increase of 29,423 tons upon the previous week, but a decrease of 26,442 tons upon the corresponding week of last year. For the year to date, the total shipments have been 8,469,076 tons—an increase of 569,121 tons.

Torquay Water Supply.—The annual inspection of the watershed and storage reservoirs of the Torquay Corporation was made by the Mayor and other members of the Corporation and several officials a few days ago. The watershed, about 2250 acres in extent, cost between £50,000 and £60,000; and the cultivated portion of it is about 300 acres. The total cost of the water-works, since their inception just over fifty years ago, has been about £250,000. The places supplied are Torquay, St. Mary Church and Cockington, Newton Abbot, Kingskerswell, Abbotskerswell, and Chudleigh. The day's arrangements were carried out by Mr. T. H. Wills, the Chairman of the Water Committee, and Mr. S. C. Chapman, the Water Engineer.

Glamorgan Water Supply.—In view of the rejection of the Glamorgan Water Bill by the Committee of the House of Lords, one of the undertakings which the proposed Water Board had agreed to purchase in the event of the Bill passing—viz., that of the Pontypridd Water Company—will probably be acquired by two local Councils. The figure originally agreed upon was approximately £330,000 for the existing works and the powers obtained by the Company for carrying out the Llia scheme; and it is reported locally that a Bill shall be promoted next session by the Rhondda and Pontypridd Councils to acquire the undertaking on these terms. A provisional agreement to this effect was come to between the two Councils in the event of the Water Bill being thrown out.

Bradford Water Supply.—The balance-sheet of the Bradford City Treasurer (Mr. G. A. Thorpe) dealing with the operations of the water undertaking for the twelve months to March 31 last, shows a net profit on the year's working of £8576. This sum is £6150 less than the profit made in the preceding year—a fact which is partly due to a reduction of income by the sum of £1146, as a consequence of the decrease of water for industrial purposes, and partly to the cost of the repairs necessitated by the great cloud-burst at Barden last year. The year's profits will reduce the deficit on the undertaking—which two years ago stood at £25,480—to the sum of only £2177. The Nidd Valley Light Railway shows a deficit on the year's working of £2234. Apart from interest, sinking-fund, and depreciation, the working of the railway resulted in a gross profit of £536.

New Water-Works for Raunds.—The completion of a scheme of water supply for Raunds has lately been celebrated. The reservoir, which has a capacity of 255,000 gallons, is situated about a mile from the pumping-station in the town. The Surveyor and Water Engineer of the Urban District Council (Mr. T. Yorke) presented the Chairman (Mr. J. Shelmerdine, J.P.) with a silver key, suitably inscribed, with which the door of the pumping-station was unlocked, and the company viewed the engines, pumps, gas plant, &c.; the necessary particulars being supplied by Mr. Yorke. Mr. Enos Smith, J.P., as Vice-Chairman and senior member of the Council, was called upon to start the pumps; and this having been done, the company moved on to the reservoir. The Chairman and the Engineer having mounted the entrance steps, the former asked Mr. Hirst Simpson to turn the valve. This gentleman did so, and congratulated the Chairman, the Council, and the town on having secured a good supply of water. The works have been carried out by Messrs. Rowell and Sons; Mr. John Eunson, of Northampton, being the Consulting Engineer for the scheme.

Proposed Extension of the Dover Water-Works.—A Local Government Board inquiry was held on Friday last, by Mr. M. K. North, M.Inst.C.E., in regard to an application by the Dover Corporation to borrow £2500 for water-works. It was stated that the proposal was to sink a shaft 180 feet deep in the property of the Corporation, connect it with the existing shaft, and drive a heading of about 600 feet from the shaft under the roadway and under land the property of the War Department, whose consent had been obtained. The object was to obtain a greater supply of water, and increase the storage capacity in the headings. They considered it necessary on account of the natural depletion of the supply; and an increased demand for water was anticipated for hotel lifts and the filling up of empty property. They had also received an application from the Admiralty for water to be used at the harbour. The Corporation thought the reservoir should be larger. Dr. M. K. Robinson (the Medical Officer of Health) expressed the opinion that there would be additional water. There had been an objection to going north-east because of the cemeteries; but he did not believe there would be any percolation. The Inspector said the question the Board would have to carefully consider would be whether the expenditure would be justified by obtaining extra water.

Theft of Gas-Fittings at Colchester.—At the Colchester Police Court last Thursday, Samuel Braddy, a painter, was charged on remand with stealing certain gas-fittings, value 11s. 4d., the property of the Colchester Gas Company. He pleaded guilty. Mr. A. G. Hawkins, who prosecuted on behalf of the Colchester Association for the Protection of Property, stated that the Gas Company had been missing articles for some time, and various people were on the look-out. On the 3rd inst., a police sergeant saw the prisoner carry a bag and a paper parcel to the house of a plumber named Partner, and on following him found he had some gas-fittings in his possession. Prisoner told the sergeant that the Manager had instructed him to take the fittings to Partner for a job he was to do for the Company; but afterwards he admitted the theft. Mr. Hawkins added that Braddy had been employed by the Company eleven or twelve years, and had been a good workman. There was, however, so much of this class of theft going on in the town, that he must ask the Bench to make an example of the prisoner. Mr. H. S. Pike, the Company's Manager, said the prisoner had been suspected for about a year, and had been watched. He had been indirectly cautioned once or twice. Prisoner said he had never taken anything else. He went to Partner's house to see if the fittings were worth anything. The Bench sentenced him to two months' hard labour.

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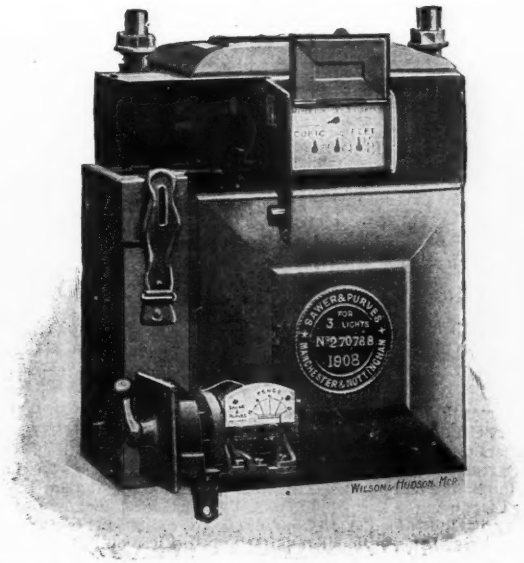


THE POSITIVE PREPAYMENT METER.

(With Attachment Detached)

Miles Platting, MANCHESTER.

Radford Road, NOTTINGHAM.

Agent for Scotland:

JNO. D. GIBSON, 93, Hope Street, GLASGOW.

Derby Gas Company's Dividend.—At the meeting of the Directors of the Derby Gaslight and Coke Company last Wednesday, an interim dividend at the rate of 5 per cent. per annum, less income-tax, was declared on the ordinary consolidated stock for the half year to June 30.

Bulawayo Water-Works Company, Limited.—The ordinary general meeting of the Company was held a few days ago. Colonel Lockwood, M.P., presided, and in moving the adoption of the report said the results lately realized were better than those of the last few years, since the Company were enabled to carry £1029 to the credit of profit and loss account. This improvement was accounted for partly by a decrease in working cost resulting from the installation of new machinery and other economies which had been effected, and partly from an increase in the number of consumers for both water and electric light. During the year the Company's prospects had considerably improved, as a large amount of building was being undertaken in Bulawayo. The motion was carried.

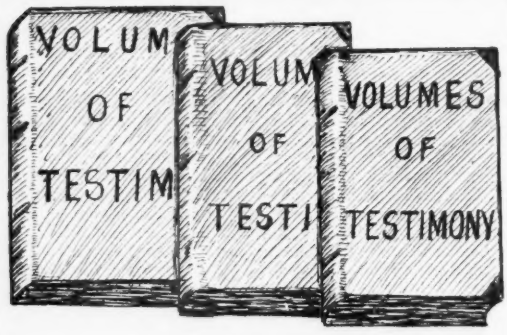
The Costs of Promoting the Salford Corporation Bill.—At a meeting of the Salford Guardians last Friday, it was stated that the total cost to them in connection with the Bill of the Salford Corporation was £515. It was submitted by Mr. Reeves that as the Corporation had withdrawn the Bill they should pay the costs. The Chairman said it was not a fact that because the Corporation withdrew the Bill they were compelled to pay the costs of the parties opposing the measure. At any rate, it did not much matter in their case, as the money would come out of the same pocket. Mr. Reeves said that was not the point. The expenditure of these sums increased the poor-rate. A resolution was passed instructing the Clerk to make application to the Corporation for the repayment of the Guardians' costs.

Water Supply for Telscombe.—On Saturday, the 24th ult., the Mayor of Brighton (Alderman Slingsby Roberts) inaugurated, in the presence of a large and representative company, the new water reservoir which has been constructed, as the result of the initiative of Mr. Ambrose Gorham, for the supply of the village of Telscombe with water obtained from the Brighton Corporation, whose Water Engineer (Mr. J. Johnston) had carried out the work. The Corporation extended their mains from Rottingdean to the eastern boundary of the parish, this being the extreme limit of their area of supply; and from this point the Newhaven Rural District Council, through the action of Mr. Gorham, laid the main up to the reservoir, built the reservoir, and laid the mains into Telscombe village. It will hold 20,000 gallons, and the water flows into it by gravitation from the reservoir on the Brighton Racecourse. The work has cost £1400.

Pontefract Gas Undertaking.—It was reported to the Pontefract Corporation a few weeks since that there was a deficiency of nearly £800 on the year's working on the gas undertaking, acquired two years ago from the Gas Company. The Mayor (Colonel Shaw), who is now absent on military duties, wrote to the Council meeting last Wednesday that he had made a special inquiry. The gross profit last year was the greatest ever known, and the working cost considerably lower. They had paid £2866 on borrowed money, £1157 on the sinking fund, and £600 as part of the parliamentary expenses. No similar trading concern could carry such a burden. The profits now exceeded by £2000 the amount required by the Company for statutory dividends; and there had been a reduction of 3d. per 1000 cubic feet in the price of gas. Mr. Lowden, the Chairman of the Gas Committee, agreed with this. The Engineer and Manager (Mr. L. V. Whitaker) added that last year what they had to buy went up, and what they had to sell went down; but everything pointed to a substantial profit this year.

Colne Valley Water Company.—At the half-yearly general meeting of this Company at Bushey last Tuesday, the Directors reported that the capital expenditure during the six months ended the 30th of June amounted to £7215, nearly £6000 of which was incurred in laying a 14-inch trunk main from the pumping-station to Watford Road, Northwood. It is proposed to continue this main to meet the rapidly increasing demand for water in parts of Pinner and Harrow. The profit amounted to £13,234. The balance of the dividend and interest account, after paying interest on the debenture and preference stock, was £18,215, out of which the Directors transferred £500 to the contingency fund account, and recommended the payment of the full statutory dividends at the rate of 10 and 7 per cent. per annum on the several classes of stock, and in addition a payment of 1 per cent. on account of back-dividends on the "A," "B," and "C" stocks; leaving £5000 to be carried forward. For the corresponding period of 1908, the amount carried forward, after paying the full statutory dividends, was £4204.

Exmouth Water Supply.—At the meeting of the Exmouth Urban District Council last Wednesday, the Water Committee informed the members of the receipt of a report from Messrs. G. H. Hill and Sons, on the result of the boring at Dolton Lane. The Engineers mentioned that the boring had reached a depth of 338 feet below the surface, the last 34 feet being in the pebble beds. The official test showed a yield of 40,000 gallons of water per hour, or 960,000 gallons per day; so that, as the estimated additional requirements of Exmouth alone in the year 1931 were placed at nearly 300,000 gallons a day, the supply furnished by the boring was adequate. The water had been analyzed by Mr. Tickle and Professor Percy Frankland, F.R.S., who both spoke of the high quality of it. The final cost of boring amounted to £1608. The parliamentary estimate of the scheme prepared last year was £43,000, of which, however, £5000 was provided to cover the extension of piping, &c., in the district during the period which would elapse before the Council might apply for further borrowing power. The amount attributable to the new source of supply was therefore £38,000. The £1606 which the boring had cost took the place of the £8700 in the parliamentary estimate for the boring, well, and adits; and the £38,000 was thus reduced to £30,906. Again, the level of the water in the borehole when three times the supply was being taken was only about 45 feet from the surface. This fact allowed economical use of a much less costly type of pumping machinery, which was estimated now at £3252. A reduction would also be shown in the cost of the trunk mains. The £38,000 was therefore still further reduced to £88,033.



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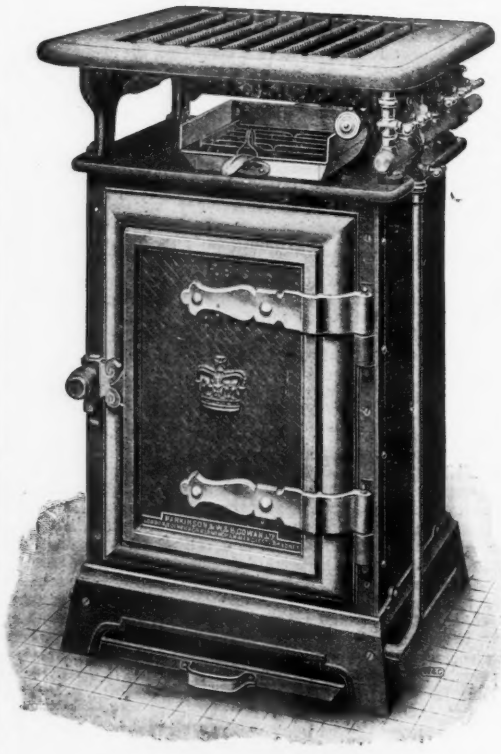

COOKER.

Is it on your Hire List?

THE PARKINSON STOVE CO., LTD.

(Incorporating Maughan's Patent Geyser Co.)

BIRMINGHAM: Stour Street.

LONDON: Office & Show-Room, 129, High Holborn, W.C.

The Spofforth Gas Company, Limited, has been registered, with a capital of £1500, in £1 shares, to supply the town named, which is near Harrogate, with gas.

The Gas Committee of the West Bromwich Corporation have accepted the tender of Messrs. Humphreys and Glasgow for the reconstruction and extension of the water-gas plant.

The Holytown Gaslight Company, Limited, was registered in Edinburgh last week. The Company are to take over the undertaking of the existing Company. The capital is £3000 in £1 shares.

When turning on the light of an electric standard in Bolingbroke Road, Wandsworth Common, last Friday night, a lamplighter received a severe shock. A doctor was sent for, but on arrival he found the man was dead.

Messrs. Joseph Taylor and Co. have received an order for one of their best and latest makes of solid-plate lead saturators, including the whole of the leadwork, in connection with the new sulphate plant at the works of the Lochgelly Gas Company, Limited.

The Keymer and District Gas Company have just concluded a contract for the public lighting at Clayton, Sussex, at £2 11s. 6d. per lamp. The Local Authority are to provide £30 towards the tender for the lighting season ending the 24th of June next.

The Directors of the South Staffordshire Water Company have resolved, subject to audit, to transfer £1000 to the credit of the depreciation fund, and to recommend to the proprietors the declaration of a dividend for the half year to June 30 on the ordinary stock at the rate of 6½ per cent. per annum, less income-tax, carrying forward a balance of £8056. For the eight half years to June, 1908, the dividend was at the rate of 7 per cent. per annum; and twelve months ago the amount carried forward was £7764.

The officials and workmen of the Ventnor Gas and Water Company had their annual outing last Wednesday. Leaving Ventnor at nine o'clock, the party drove through Wroxall to Newchurch, where a short halt was made, and then went on to Sea View. After an hour spent there, the journey was continued along the sea front to Ryde, where dinner was served at the Albany. The Directors and Mr. Ineson, the Engineer, Manager, and Secretary of the Company, were, at the conclusion of the repast, heartily thanked for providing so pleasant a day's outing. Three hours were spent at Ryde; and then a start was made for the celebrated Eight Bells at Carisbrooke, where tea was served. Ventnor was reached at ten o'clock.

The Cardiff Water Committee last week again had before them the question of the increase of the salary of their Engineer, Mr. C. H. Priestley, consequent upon the construction of a new reservoir in the Brecon Beacons area. The previous recommendation of the Committee that Mr. Priestley's salary be increased by £250 during the construction was referred back to them, in order that the question of raising the salaries of others under Mr. Priestley, upon whom extra work would be thrown in consequence of the new works, might be taken into consideration. It was pointed out that under the agreement governing Mr. Priestley's appointment, they could not call upon him to do this work; and if they appointed an outsider, the cost would be considerably greater. Finally, the Committee reaffirmed their previous resolution to increase Mr. Priestley's salary by £250 per annum during the construction of the reservoir, and to give Mr. Neil Peters, the Deputy-Engineer, an increase of £75 a year, and Mr. Rewell, the Engineering Assistant, an increase of 10s. per week during the same period.

APPLICATIONS FOR LETTERS PATENT.

17,246.—Boult, A. J., "Regenerative furnaces." A communication from the Blair Engineering Company. July 24.
17,281.—Hayden, H. L., "Gas-burners." July 24.
17,288.—Snellgrove, H. W., "Gas cooking appliance." July 26.
17,299.—Murray, W. G., and Cox, E. J., "Gas-turbine." July 26.
17,304.—Davis, I. H., "Regulating taps with locking arrangement." July 26.
17,314.—Helps, G., "Gas-burners." July 26.
17,316.—Walton, W., "Body combined with a bunsen tube and mixing-chamber for incandescent gas lighting." July 26.
17,325.—Huff, A. & O., "Inverted burners." July 26.
17,341.—Madras, A. S., "Apparatus for gas-rings." July 26.
17,348.—Westgate, J., "Gas-retorts." July 26.
17,380.—Müller, A., and Bomhard, C., "Purifying gases." July 26.
17,406.—Thompson, W. E., "Testing meters." July 27.
17,420.—Hiby, W., "Treatment of gases produced by destructive distillation of coal." July 27.
17,433.—Bark, B. & S. E., "Anti-vibrator." July 27.
17,458.—Glover, R. B. G., "Street or like gas-lamps." July 27.
17,486.—Delage, M., and Woog, P., "Lighting gas-burners electrically." July 27.
17,495.—White, F. H., "Acetylene generators." July 28.
17,527.—Kurz, J. & R., "Inverted lamps for acetylene." July 28.
17,541.—Zarine, W., "Production of carburetted air." July 28.
17,570.—Crombie, W. A. E., "Distillation of coal, peat, wood, and the like." July 28.
17,574.—Pace, P. C., "Manufacture of air gas." July 28.
17,578.—Scott, J., "Gas-heaters." July 29.
17,591.—Lane, H., "Hydrogen gas producing apparatus." July 29.
17,620.—Siemens Schuckertwerke G. m. b. H., "Indicating differences of pressure." July 29.
17,638.—Kent, W. G., and Hodgson, J. L., "Differential pressure-gauges." July 29.
17,703.—Reavell and Co., Limited, Reavell, W., and Jones, E. W., "Fluid-pressure engines, pumps, or exhausters, compressors, and liquid meters." July 30.
17,705.—Keith, J. & G., "Windlasses for raising and lowering suspended lamps for street lighting." July 30.
17,716.—Parkinson, B. R., and Woodall, H., "Packing of spigot and socket joints of pipes and tubes." July 30.
17,719.—Siemens Schuckertwerke G. m. b. H., "Indicating differences of pressure." July 30.
17,722.—Kent, W. G., and Hodgson, J. L., "Fluid meters." July 30.
17,735.—Aktiebolaget Eskilstuna Separator and Andersson, C. E., "Pressure burners." July 30.
17,736.—Harris, H. W., "Gas valves or cocks." July 30.
17,771.—Laigle, R., "Filaments for gas-lamps." July 30.
17,816.—Bland, C. W., and Glover, T., "Inverted street-lamps." July 31.

It has been announced that letters of allotment of the issue of first mortgage bonds of the Cincinnati Gas Transportation Company, recently advertised in our columns, have been posted.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations, &c., Vacant.

Gas Engineer and Manager. Workington Corporation. Applications by Aug. 20.
Gas Manager and Secretary. Cockermouth Urban District Council. Applications by Aug. 17.
Clerk of Works (Knowledge of French) for Continent. No. 5123.
Draughtsman. No. 5124.
Stoker and Lamplighter. Builth Wells Gas-Works.

Situation Wanted.

Gas Company's Office Work or Show Room, &c. No. 5118.
Engineer with Experience in Retort Erection. No. 5119.
Representative. No. 5122.

Plant, &c. (Second-Hand), for Sale.

Purifier, Exhauster and Steam Engine, Gasholders, &c. Kirkintilloch Gas Department.
Station Meter and Governor. Widnes Gas-Works.

Patents Licences.

Acetylene Generators, Lamps, &c. Haseltine, Lake, and Co., Chancery Lane, W.C.

Meetings.

Brighton and Hove Gas Company. London Office, Aug. 27, Two o'clock.
Bromley and Crays Gas Company. Offices, Aug. 12, Six o'clock.
North Middlesex Gas Company. London Office, Aug. 25, 2.30 o'clock.
Southgate Gas Company. London Office, Aug. 19, 3.45 o'clock.

TENDERS FOR

Coal and Cannel.

Clacton Urban District Council. Tenders by Aug. 18.
Rochdale Gas and Electricity Department. Tenders by Sept. 1.
Tenby Gas Company. Tenders by Aug. 20.

Lime and Canvas Bags.

Bradford Gas Department. Tenders by Aug. 27.

Meter (Station), &c.

Cleator Moor Urban District Council. Tenders by Aug. 20.

Nitrate of Soda.

Bradford Gas Department. Tenders by Aug. 27.

Pipes, &c.

Tredegar Urban District Council.

Spirits of Salt.

Bradford Gas Department. Tenders by Aug. 27.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
Palmerston House,
Old Broad Street, London, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
Andrew Stephenson, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, Oldham, and 51 & 47, Westminster Bridge Road, London, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
Repairs receive prompt attention.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams:—
"Braddock, Oldham," and "Metrique, London."

OXIDE OF IRON (BOG ORE).
ANY QUANTITY. ANY PORT. ANY STATION.
DONALD M'INTOSH,
110, CANNON STREET, LONDON.

KRAMERS AND AARTS WATER-GAS PLANT.
K. & A. WATER-GAS COMPANY LTD.
89, VICTORIA STREET, S.W.

OXIDE OF IRON.
(NATURAL.)
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT.
PAINT FOR GAS-WORKS.
BALE & CHURCH,
5, Crooked Lane, London, E.C.

SULPHURIC ACID.
SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated Wm. Pearce & Sons, Ltd.,
86, Mark Lane, London, E.C. Works: Silvertown.
Telegrams: "Hydrochloric, London."
Telephone: 341 Avenue.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.

Payable in advance. If credit is taken, the charge is 25s. a year.

Abroad (in the Postal Union): £1 7s. 6d., payable in advance.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

BENZOL AND CARBURINE FOR GAS ENRICHING.

ALSO

THE MAXIM PATENT CARBURETTOR.

For Prices, &c., apply to THE GAS LIGHTING IMPROVEMENT CO., LTD., 7, BISHOPSGATE STREET WITHOUT, LONDON, E.C.

Telegraphic Address: "Carburine, London."

LUX'S GAS PURIFYING MASS. See Advertisement on p. 414. FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

BROTHERTON & CO., LIMITED. Offices: City Chambers, LEEDS. Correspondence invited.

APPLY TO THE

CHAIN BELT ENGINEERING CO. DERBY, ENGLAND,

FOR REALLY HIGH-CLASS

ELEVATORS AND CONVEYORS

ALSO

DRIVING AND CONVEYOR CHAINS.

METER INDICES WITH AND WITHOUT DIALS.

A. ROUX & CO., Limited, 9, SOUTHAMPTON STREET, HOLBORN, W.C.

MOVEMENTS FOR CLOCKS, PHOTOMETERS AND BAROGRAPHS, WHEELS, PINIONS AND WORMS.

WORKS, HANDSWORTH, BIRMINGHAM.

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia. BROTHERTON AND CO., LTD., Chemical Manufacturers, Works: BIRMINGHAM, LEEDS, WAKEFIELD, and SUNDERLAND.

SPENCER'S PATENT HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.

See Illustrated Advertisement Aug. 3, p. 291.

D. ANDERSON AND COMPANY, GAS LIGHTING ENGINEERS AND CONTRACTORS, 18 & 20, FARRINGDON ROAD, LONDON, E.C.

Telegrams: "DACOLIGHT LONDON." Telephone: 2336 HOLBORN.

TAR WANTED.

National Telephone 7002. Telegrams: "UPRIGHT."

Apply, **THOMAS HORROCKS** Albert Chemical Works, BRADFORD, MANCHESTER.

Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Sulphate of Ammonia.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.

Twice as Rich as Bog Ore.
Gives no back Pressure.
The Cheapest in the Market.

READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.

We guarantee promptness, with efficiency for Repairs.

JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.

Telegrams: SATURATORS, BOLTON. Telephone 0848.

J. E. C. LORD, Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

AMMONIACAL Liquor wanted. BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

BRISTOL RECORDING GAUGES AND THERMOMETERS.

J. W. & C. J. PHILLIPS, 23, COLLEGE HILL, LONDON, E.C., and 25, BRIDGE END, LEEDS.

AMMONIACAL Liquor wanted. CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS. Telegrams: "CHEMICALS."

"VITERNUS" METALLIC PAINT FOR GAS-WORKS PLANT.

JOHN E. WILLIAMS AND CO., LOWER MOSS LANE, MANCHESTER, S.W.

Telegrams: "ENAMEL." National Telephone 1759.

TO Gas Managers, &c., Wanted, Old Condemned GAS-METERS, from 1-light to 1000-light, for destruction to re-claim Metals. Write for Prices, Stating Quantities and Sizes, and if Wets or Drys. Scrap Metals, Drosses, Metal Shop Sweepings, &c., also bought.

J. WILSON, Pleasant Grove, York Road, King's Cross, LONDON, N.

FIDDES-ALDRIDGE

SIMULTANEOUS Discharging-Charger. The one Machine which Discharges and Charges at One Stroke.

See Advertisement, June 22, p. VI. of Centre.

ALDRIDGE AND RANKEN, 39, VICTORIA STREET, WESTMINSTER, S.W.

Telegrams: "MOTORPATHY, LONDON." Telephone: 5118 WESTMINSTER.

SULPHURIC ACID.

SPECIALLY prepared for Sulphate of AMMONIA Makers by CHANCE AND HUNT, LIMITED, Works: OLDBURY, WEDNESBURY, AND STAFFORD. Address Correspondence and Inquiries to OLDBURY, WORCS.

Telegrams: "CHEMICALS, OLDBURY."

GAS TAR wanted. BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

"GAZINE" (Registered in England and Abroad). A radical Solvent and Preventative of Naphthalene Deposits, and for the Automatic Cleaning of Mains and Services.

It is also used for the enrichment of Gas.

Manufactured and supplied by C. BOURNE, West Moor Chemical Works, KILLINGWORTH, or through his Agent, F. J. NICOL, Pilgrim House, NEWCASTLE-ON-TYNE.

Telegrams: "DORIC," Newcastle-on-Tyne. National Telephone No. 2497.

GAS OILS.

MEADE-KING, ROBINSON, & CO. Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

GEO. NEWTON, Limited, Wires: "AUTOMATIC, MANCHESTER."

40 YEARS' REPUTATION.

WET, DRY, ORDINARY and PREPAYMENT, STATION METERS, &c.

Late of Oldham—Note *new* Address:—

39, RIVER STREET HULME, MANCHESTER.

ROBERT B. FITZMAURICE, 4, EAST INDIA AVENUE, LEADENHALL STREET, LONDON.

Telegraphic Address: "FITZMAURICE, LONDON." Telephone: No. 11,113 CENTRAL. Established 1887.

Advertiser, who is Shipping Agent to several Gas Companies, Municipalities, and Gas Material Makers, would be glad to undertake SHIPMENT OF GOODS ordered by Colonial Gas-Works or Others.

R. & G. HISLOP,

GAS ENGINEERS, RETORT BUILDERS, CONTRACTORS, &c.

RETORT SETTINGS, COAL-TESTING PLANT, BOILER FIRING.

UNDERWOOD HOUSE, PAISLEY.

DELLWIK-FLEISCHER WATER GAS.

BLUE WATER GAS, CARBURETTED WATER GAS, SELF-CARBURETTING.

FOR Particulars of Annual Generating Capacity of Plants built or in course of construction, see Advertisement in the "JOURNAL" for July 27, p. 278.

The DELLWIK-FLEISCHER WATER GAS SYNDICATE, 25, Victoria Street, Westminster, LONDON, S.W. Telegraphic Address "Dellwik, London."

AMMONIA. Consumers in any form are invited to correspond with CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.

GAS PLANT for Sale—We can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.

FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.

MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

APPLICATIONS for Appointments arranged effectively. Greatly appreciated by Recipients. Numerous unsolicited Testimonials. Write Now for Particulars.

HERBERT GREATOREX, Birchover, MATLOCK.

MR. WM. CRANFIELD, F.C.S., in re- sponse to requests, has decided to extend the work he has been carrying on by Gas Classes in various Yorkshire Towns for the past Ten Years, and to organize postal courses of Tuition in "Gas Engineering" and "Gas Supply." Close personal attention will be given to the needs of each individual Student, and Expert Assistance has been engaged. All Inquiries treated confidentially.

Full Particulars on Application to No. 11, Avondale Place, HALIFAX.

ADVERTISER (Aged 35), of Good Ad- dress, requires APPOINTMENT. Having General Knowledge of Routine in Gas Company's Office, Hire Department, Meter Taking, &c., or in Show-Room of Gas Company or Fittings House. Good Credentials.

Address No. 5118, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ENGINEER, with Experience in Retort Erection, both Horizontal and Vertical, in England and Abroad, seeks an ENGAGEMENT where his Constructional Skill would be of Advantage.
Address No. 5119, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENTLEMAN, having very extensive Connection among Gas and Railway Companies, Corporations, &c., desires to REPRESENT a First-Class Firm.
Address No. 5122, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Stoker and Lamplighter for Small Works. Constant Situation to suitable Man. Wages 25s. weekly.
Apply to S. G. TULK, Gas-Works, BUILTH WELLS.

CLERK of Works required during the Carrying out of Extensions at a Gas-Works on the Continent, including New Retort-House equipped with Conveying Machinery, &c., &c. Knowledge of French indispensable.
Apply, stating Age, Experience, References, and Salary expected, to No. 5123, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

DRAUGHTSMAN.

WANTED, a Draughtsman for Civil Engineer's Office, thoroughly Capable of making all Drawings for Water and Gas Works Schemes.
Salary, 50s. per Week.
Apply, by letter, sending *copies* only of Three recent Testimonials, and stating Full Qualifications, to No. 5124, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COCKERMOUTH URBAN DISTRICT.

GAS MANAGER AND SECRETARY.

THE Cockermouth Urban District Council invite APPLICATIONS for the Position of GAS MANAGER and SECRETARY, who will be required to devote the whole of his time to the duties of the Office.
Salary, £120 per Annum, with free House, Coal, and Gas, and the privilege of taking an Articled Pupil.
Applications, endorsed "Gas Manager," stating Age and Particulars of previous Experience, together with not more than Three recent Testimonials, to be sent in to me the undersigned on or before the 17th day of August inst.
The person appointed will be required to take up his duties on the 1st of September next, or as early as possible after that date.

J. W. DRUMMOND,
Clerk of the Council.

Cockermouth,
Aug. 5, 1909.

BOROUGH OF WORKINGTON.

GAS ENGINEER AND MANAGER.

WANTED, by the Workington Cor- poration Gas Committee a qualified GAS ENGINEER and MANAGER to Take Entire Charge of their Gas Undertaking. Make of Gas, upwards of 100 Million Cubic Feet.
Salary, £250 per Annum.
Candidates must state Age, Training, Qualifications, and Particulars of Experience. Chemistry, Theory and Practice of Gas Manufacture, and some actual Works Practice indispensable.
Applications, endorsed "Gas Engineer and Manager," and accompanied by *copies* of Testimonials of recent date, not exceeding Three (which will *not* be returned), must be lodged with the undersigned on or before noon of the 20th inst.
Candidates must state when they can commence duties.
Canvassing the Members of the Committee, either directly or indirectly, will be a Disqualification.

JOHN WARWICK,
Town Clerk.

Town Hall, Workington,
Aug. 5, 1909.

PURIFIERS—Set of Four, 12 feet Square, fixed complete, £300. A bargain. Also Four 6 feet Square, Two 8 feet, Four 8 feet, and Two 12 feet square PURIFIERS. Cheap.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

GASHOLDERS—Splendid, 45 feet dia- meter, and New STEEL TANK fixed complete, £600 to Plan and Specification. Also 50 feet Single-Lift and 50 feet Double-Lift. Cheap, with STEEL TANKS. Can be seen temporarily erected.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

WASHERS and Scrubbers — Two "Livesey" WASHERS. One "Clapham" WASHER. TOWER-SCRUBBERS, 3 ft. 6 in. by 16 ft., 4 ft. by 16 ft., and 7 ft. diameter by 55 ft. high. Sold at Bargains, being overstocked.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

CONDENSERS—Clapham's, also Cutler's Water-Tube CONDENSERS. Pipe CONDENSERS, 4-inch to 10-inch diameter. Annular CONDENSERS, 8-inch, 10-inch, and 12-inch. Erected Complete and Cheap.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

STATION Meters and Governors— Several in Stock, 4-inch to 18-inch, with New Drums. Prompt Execution.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

PUMPS, Tanks, &c.—Two and Three- throw PUMPS, Belt or Steam Driven, and Single and Double-acting Verticals and Horizontals. Large Stock of Tanks and all Sundries.
FIRTH BLAKELEY'S, Thornhill, DEWSBURY.

FOR SALE—A 20,000 Cubic Feet per hour STATION METER, with 12-inch Valves and Connections Complete. Good Condition. Also a 14-inch STATION GOVERNOR (W. Cowan's Patent).
Further Particulars from the GAS-WORKS, WIDNES.

BURGH OF KIRKINTILLOCH.

(GAS DEPARTMENT.)

THE above Council have for Disposal the following SECOND-HAND PLANT; and are prepared to receive Offers for same.
One PURIFIER, water-lute type, 20 feet by 10 feet, with Three Valves and Connections.
One Laidlaw EXHAUSTER and STEAM-ENGINE combined on one Bed-Plate, with Valves, Bye-Pass Compensator, and Steam Governor; maximum capacity, 10,000 cubic feet per hour.
One small Single-Lift GASHOLDER; capacity, 12,500 cubic feet.
One Double-Lift GASHOLDER; capacity, 96,000 cubic feet.
Further Information may be had from the undersigned.

JAMES BELL,
Engineer and Manager.

Gas-Works, Kirkintilloch.

URBAN DISTRICT COUNCIL OF TREDEGAR.

TENDERS are invited for the Supply of 66 Yards of 12-inch and 555 Yards of 10-inch Cast-Iron Spigot and Socket GAS-PIPES.
Full Particulars and Form of Tender may be obtained from the undersigned.

D. WALTER DAVIES.

Gas and Water Department,
Manager's Office, Tredegar, Mon.,
July 31, 1909.

TENDER FOR COAL.

THE Directors of the Tenby Gas Con- sumers Company, Limited, invite TENDERS for the Supply of 2000 Tons of GAS COAL for Delivery over the ensuing Twelve Months at the Tenby Railway Station or Harbour.
For Particulars and Form of Tender Apply to the undersigned.
Sealed Tenders, endorsed "Tender for Coal," to be delivered to the Secretary, C. W. R. Stokes, Esq., Bellevue Chambers, Tenby, on or before Aug. 20.

ALFRED H. BROOKMAN,
Engineer and Manager.

Tenby, Aug. 6, 1909.

CLACTON URBAN DISTRICT COUNCIL.

THE above Council invite Tenders for the Supply and Delivery of about 5000 Tons of Best Screened GAS COAL, in Quantities as may be required during the ensuing Twelve Months.
Particulars and Form of Tender may be obtained upon Application to the Consulting Engineer, Mr. Sydney Francis, Assoc.M.Inst.M.E., Town Hall, Clacton-on-Sea.
Tenders, Sealed and Endorsed "Tender for Coal," to be delivered to the undersigned not later than noon on Wednesday, the 18th inst.
The Council do not bind themselves to accept the lowest or any Tender.

GEO. T. LEWIS,
Clerk to the Council.

Town Hall, Buildings,
Clacton-on-Sea, Aug. 4, 1909.

CLEATOR MOOR URBAN DISTRICT COUNCIL.

THE above Council invite Tenders for a STATION METER of 6000 Cubic Feet Hourly Capacity at 100 Revolutions. To be Complete with Cradle, Clock, Tell-Tale, Syphon-Overflow, 8-inch Valves, and all other necessary Equipments.
With each Offer there must be furnished a full Description, Dimensions, and Design of the Meter.
The Council do not bind themselves to accept the lowest or any Tender.
Prices to be quoted Delivered and Erected on the Council's Foundation at Cleator Moor Gas-Works.
Sealed Tenders, endorsed "Station Meter," to be forwarded to the undersigned not later than Aug. 20, 1909.

HENRY ROTHERY,
Clerk to the Council.

Public Offices, Cleator Moor,
July 30, 1909.

TO ALKALI MANUFACTURERS, CHEMICAL MERCHANTS, LIME MERCHANTS, AND BAG MERCHANTS.

THE Gas Committee of the Bradford Corporation invite TENDERS for the Supply of the undernamed GOODS, required at the Chemical Works, Frizinghall, during the ensuing Twelve Months—viz:
16,000 Carboys of SPIRITS OF SALT, containing a Minimum of 28 per cent. HCl, and not more than 0·02 per cent. Arsenic, delivered in Lots of 400 as required.
80 Tons of refined quality NITRATE OF SODA, containing a Maximum of 4 per cent. Refraction, including not more than 1 per cent. of Chlorides, delivered in 10 Ton Lots as required.
300 Tons of Best Hand-Picked LIME, free from Stone, and testing 96 per cent. Ca.O. delivered at Frizinghall Siding (Midland Railway) in Truck Loads as required.
20,000 Second-Hand CANVAS BAGS, known as "Bombay Twills," measuring 27 in. by 45 in., mended and perfect, delivered in Lots of 2500 as required.
Tenders, endorsed "Tender for Spirits of Salt," "Nitrate of Soda," "Lime," or "Canvas Bags," as the case may be, together with Sample Canvas Bag, to be forwarded to the Town Clerk, on or before Nine a.m. Aug. 27, 1909.

COUNTY BOROUGH OF ROCHDALE.

TO COLLIERY OWNERS AND OTHERS.

THE Gas and Electricity Committee of the above Corporation invite TENDERS for the Supply of 50,000 Tons of GAS COAL during a period of Ten Months from the 1st of September, 1909.
Forms of Tender and any further Particulars may be obtained on Application to Mr. T. Banbury Ball, the Manager, at the Gas-Works, Dane Street.
Tenders, endorsed "Gas Coal," and addressed to the Chairman of the Gas and Electricity Committee, must be sent in to me not later than Noon on Wednesday, Sept. 1, 1909.

By order,
WM. HENRY HICKSON,
Town Clerk.

Town Hall, Rochdale,
Aug. 5, 1909.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Friday, the 27th of August, 1909, at Two o'clock p.m., precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1909; to declare Dividends; to elect Auditors; and for other purposes.
The TRANSFER BOOKS of the Company WILL BE CLOSED from the 14th to the 27th of August, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 9, 1909.

BROMLEY AND CRAYS GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held on Thursday, the 12th day of August, 1909, at Six o'clock p.m. precisely, and on this occasion at the Company's Offices, 156, High Street, Bromley, Kent, to receive the Report of the Directors; the Balance-Sheet certified by the Auditors; to declare a Dividend; and to Transact generally the Business of a General Meeting.
The TRANSFER BOOKS WILL BE CLOSED from the 29th of July to the 12th of August, 1909, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: 156, High Street,
Bromley, Kent, July 27, 1909.

NORTH MIDDLESEX GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Wednesday, the 25th day of August inst., at Half-past Two o'clock p.m., to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1909; to declare Dividends; and for other purposes.
The TRANSFER BOOKS of the Company WILL BE CLOSED from the 12th to the 25th of August, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 5, 1909.

SOUTHGATE AND DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Thursday, the 19th day of August inst., at 3.45 o'clock p.m. precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 30th of June, 1909; to declare Dividends; to elect an Auditor; to determine the remuneration of the Directors; and for other purposes.
The TRANSFER BOOKS of the Company WILL BE CLOSED from the 6th to the 19th of August, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 4, 1909.

THE Proprietor of the Patents No. 7188 of 1901, for "IMPROVEMENTS IN OR RELATING TO ACETYLENE GAS-LAMPS or GENERATORS;" No. 11,612 of 1902, for "ACETYLENE GAS-LAMP for TABLE USE; No. 23,629 of 1903, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS;" No. 10,185 of 1905, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS" is desirous of entering into Arrangements, by way of LICENCE and Otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring their full Development and Practical Working in this Country.
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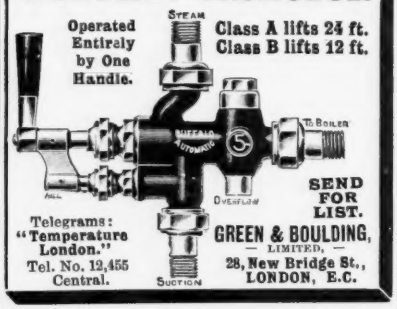

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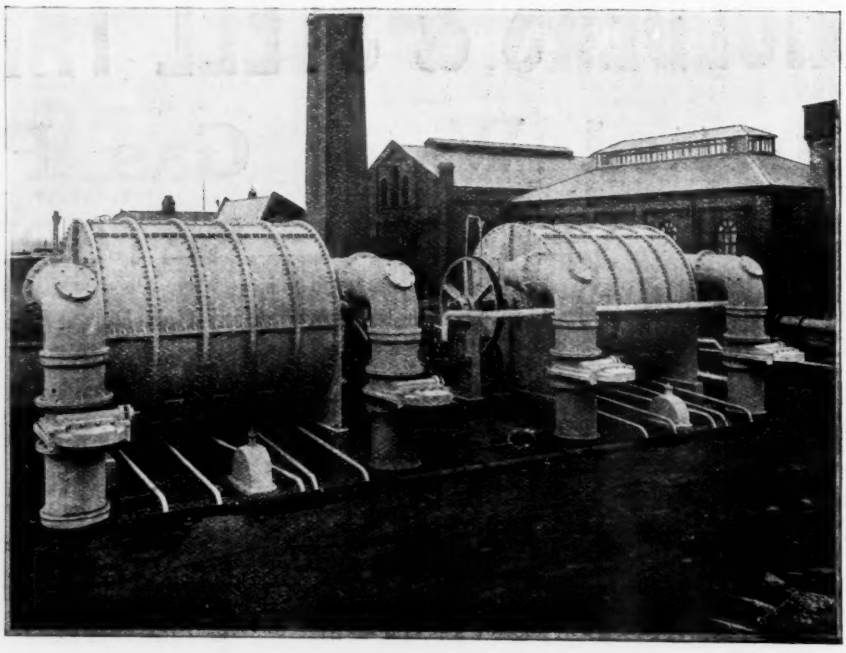

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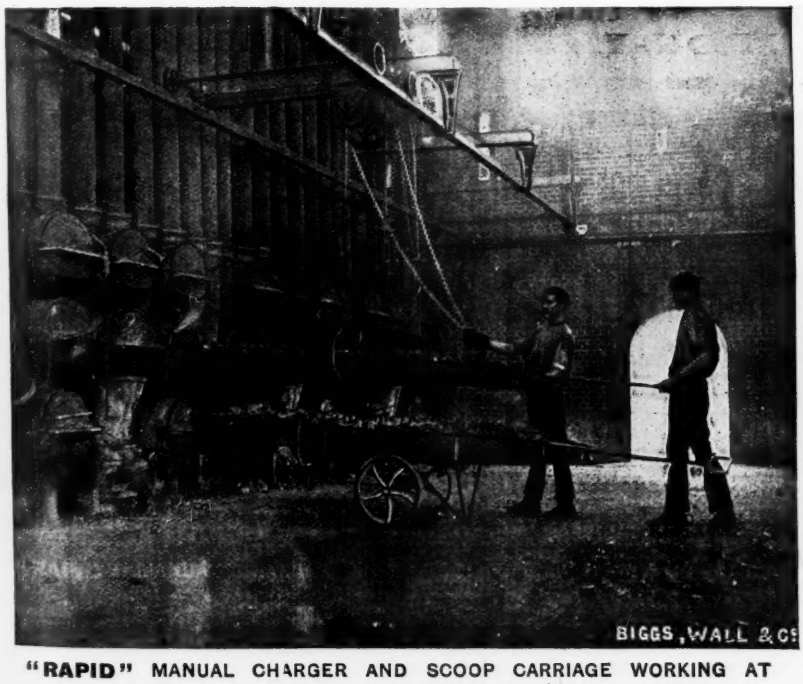

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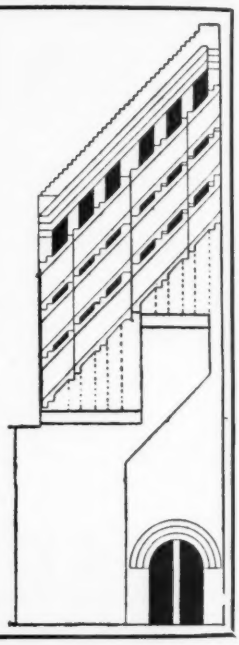

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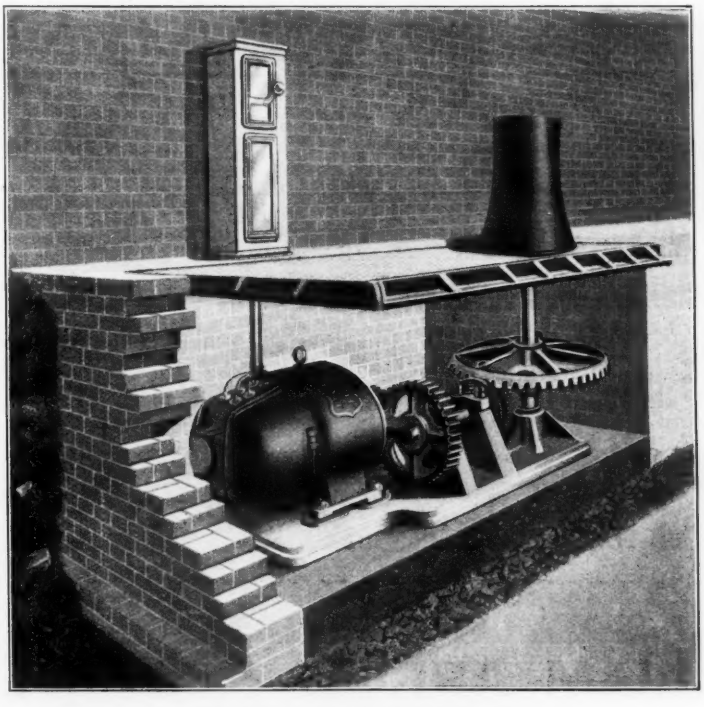

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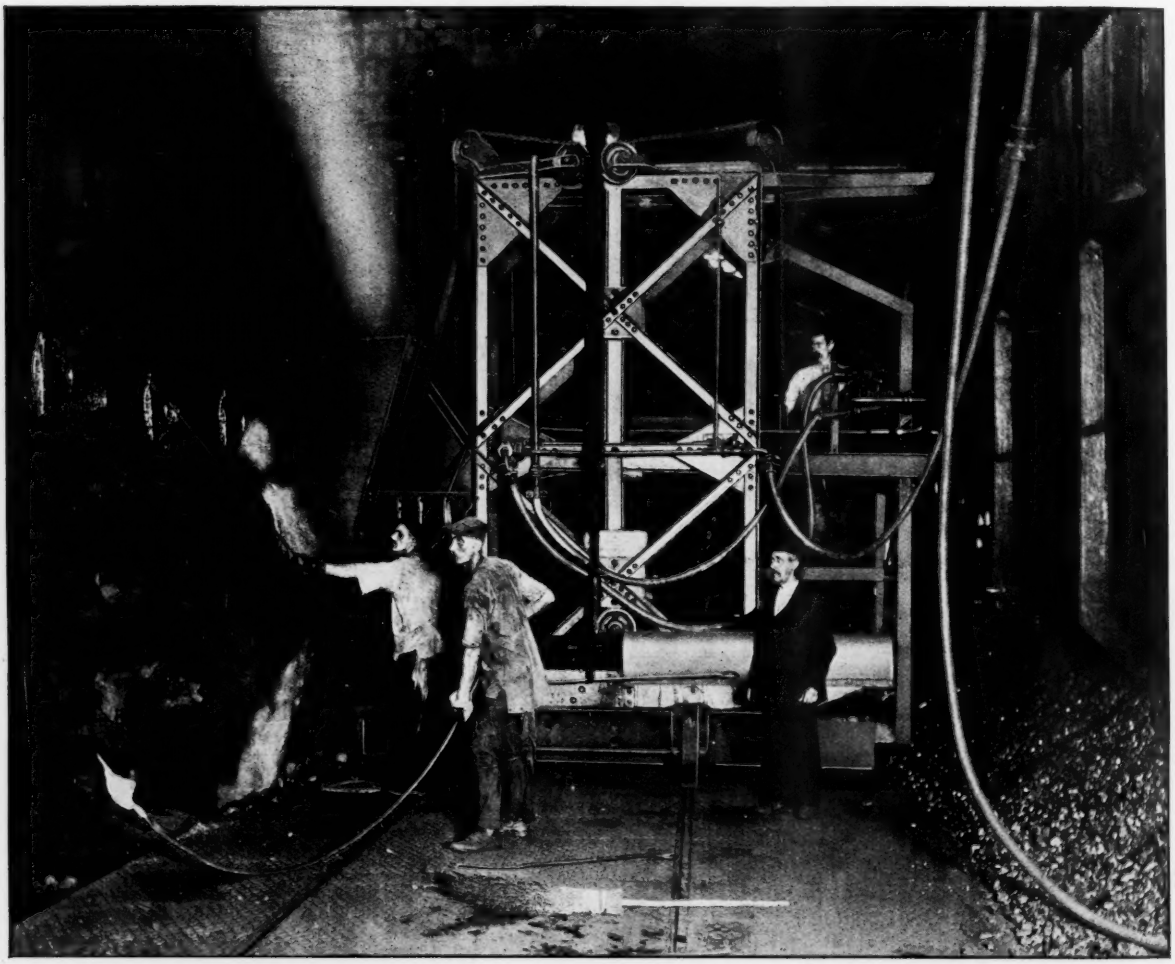

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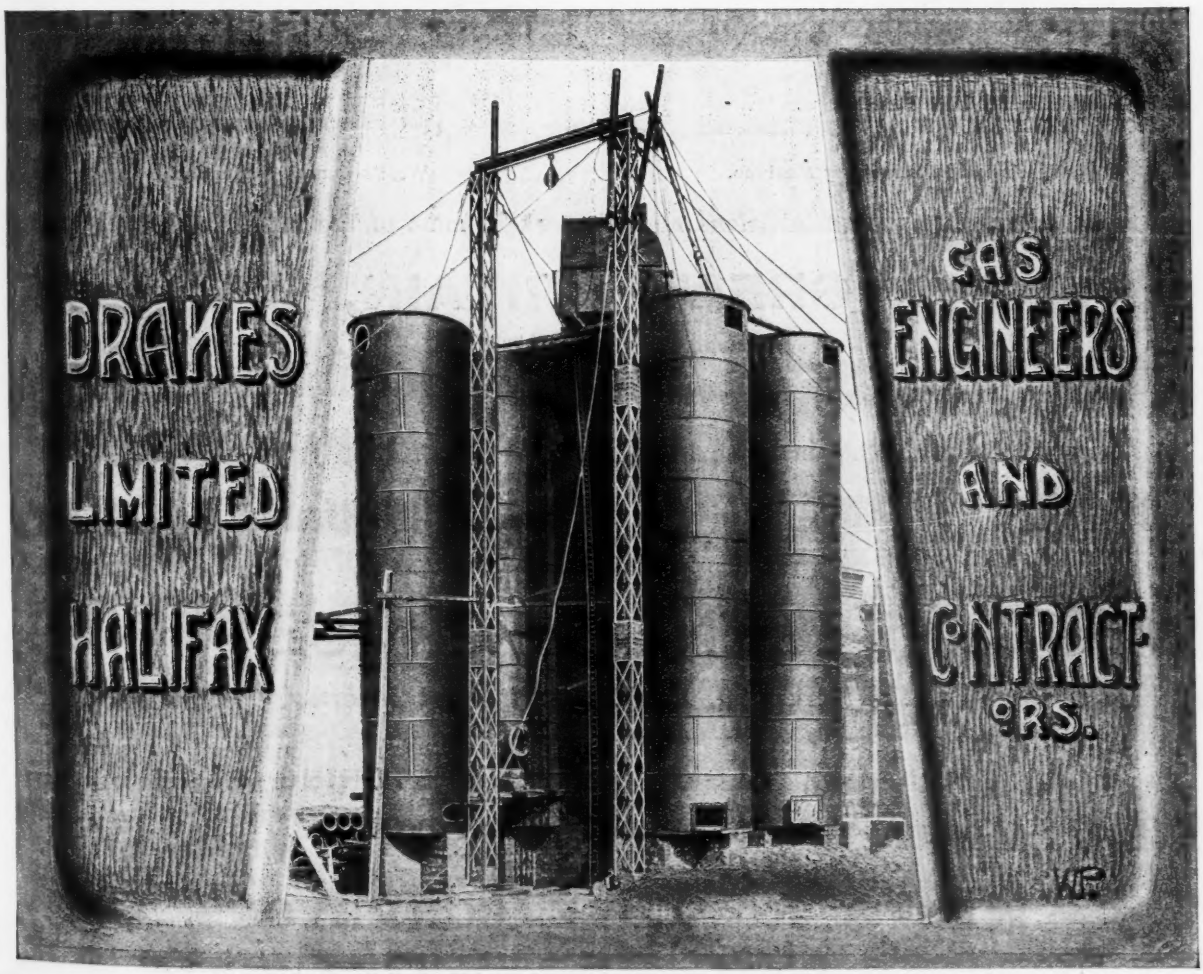

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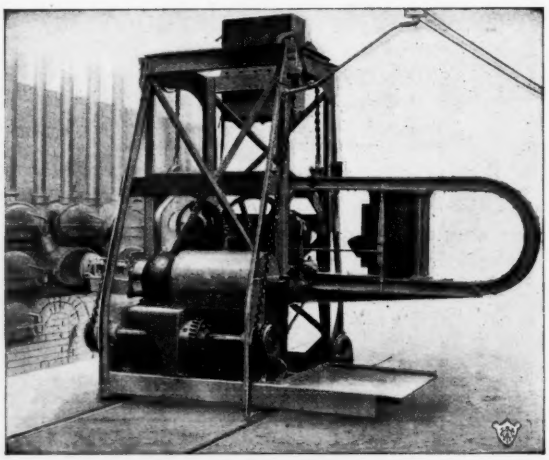

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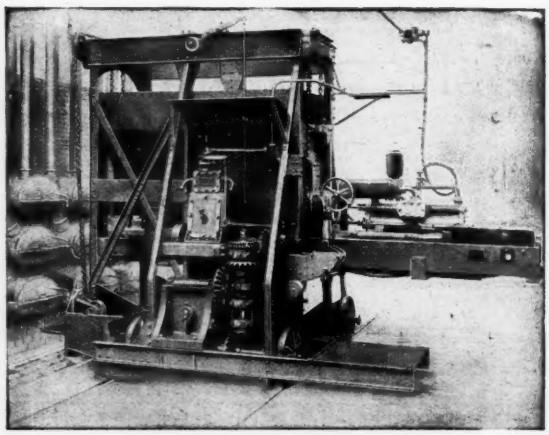

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